

A REVIEW, AND A REVISION IN GREATER PART, OF THE CTENISCINI OF THE OLD WORLD (HYM., ICHNEUMONIDAE)

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SYNOPSIS

The systematic position and characters of the tribe are briefly reviewed, and there follow discussions of some descriptive terms and some characters used in this study. The genera are discussed from the points of view both of taxonomy and nomenclature, and a new key to genera is given, taking account of the Old World species and of those from the New World known to the author. The genera *Anisoctenion*, *Exyston*, *Smicropectrus*, and the 'black-bodied' species of *Cteniscus* are fully revised, with descriptions of old and new species and with keys. Much fresh European information on the genus *Exenterus* is given, with a key to the Old World species. The remaining sections are less fully treated. Altogether two new generic names are proposed, and ten new species are described, with one new variety and one aberration named. Some new synonymy is given. The paper is illustrated by eighty-six text-figures and four plates.

INTRODUCTION

THE subfamily Tryphoninae, to which the Cteniscini belong, has recently been re-defined by Townes & Townes (1949) to include all those ectoparasitic genera in which there is a large or rather large stalked egg, of which only the anchor passes down the

channel of the ovipositor. The ovipositor (stylet) is not dorsally notched near the apex, or only occasionally weakly so. Thus the subfamily now includes the Cteniscini, Tryphonini, Sphinctini, Eclytini (= *Eclytus* + the 'Thymaridini') and a number of tribes mostly not included by the earlier authors; and it excludes not only the Metopiinae and Diplazoninae, but also almost the whole of the 'Mesoleptini' of authors. The steps leading to this position were reviewed by Kerrich (1942, pp. 64-65).

The Cteniscini differ from the other Tryphonine tribes, as from all other Ichneumonidae, in having the middle tibia with a single spur, and the hind tibia without a spur or with a very short one, much shorter than the apical breadth of the tibia where it issues. Usually the female of the species has more bright coloration than the male, whereas in Ichneumonidae generally the reverse is the case. They are most closely related to the genus *Polyblastus* of the Tryphonini, as recorded by Thomson (1883) and by Townes & Townes (1949).

As in other Tryphoninae, the female of the species is often to be found carrying an egg on the ovipositor. In the genera *Exyston* and *Smicroplectrus* the egg is often seen to be nearly or quite ready to hatch. This recalls the case of *Polyblastus* (see Kerrich, 1936), but only a single egg is carried at a time. It argues that a female individual must be long-lived to deposit all her eggs.

I have been able to see a vastly greater amount of material of this tribe than has ever before been studied by any one taxonomist in Europe; and the confidence with which species have been separated or synonymized, and the assessment made of the range of variation within species, could not have been attained in any other way. For the loan, or in a few cases the gift, of such material I am much indebted to Dr. Kjell Ander, Dr. L. Berland, Dr. J. G. Betrem, Dr. H. C. Blöte, Dr. Z. Bouček, Mr. H. Britten, Monsieur E. Cavro, Professor G. Ceballos, Monsieur A. Collart through co-operation of Dr. J. Leclercq, Mr. H. W. Daltry, Mr. E. A. Ellis, the late Dr. E. O. Engel, Dr. Ch. Ferrière, the late Professor Fr. Gregor, Mrs. F. H. Haines, Rektor K. Hedwig, Herr Gerd Heinrich, phil. Mag. W. Hellén, Mr. W. D. Hincks, Herr Rolf Hinz, Dr. R. Krogerus, Dr. Th. Kupka, Professor Dr. O. Lundblad, Herr B. Maixner, Dr. R. Malaise, Dr. L. Masi, Professor H. W. Miles, Mr. C. Morley, Lektor Å. Nordström, Mr. J. F. Perkins, the late Herra A. Saarinen, Dr. Erich Schmidt, Mr. A. W. Stelfox, Dr. H. G. M. Teunissen, Professor E. Tortonese, Rev. C. E. Tottenham, Dr. H. K. Townes, and Professor T. Uchida.

Outstandingly valuable to me have been the collection of the British Museum (Natural History), which I was also privileged to study before obtaining my present professional position, the Wesmael-Tosquinet collection of the Royal Natural History Museum, Brussels, and the collection of Mr. A. W. Stelfox. Dr. Th. Kupka's collection was especially helpful in the earlier stages of the work, as were specimens given me by Rektor K. Hedwig, which I could compare with Gravenhorst specimens and then retain. Dr. H. K. Townes and Mr. W. R. M. Mason have kindly lent me nearctic material, which has better enabled me to assess generic limits.

The material is mostly in the private collections of the persons mentioned, or in the museum collections of which they have charge, except that some specimens have now been presented to or exchanged with the British Museum (Natural History). The British Museum contains (apart from some British material sent in exchange to

Cambridge in 1931) the J. F. Stephens, T. Desvignes, T. A. Marshall, Ruthe, Buchecker, and R. von Stein collections; and all material here recorded as collected by Dr. R. C. L. Perkins, Mr. and Mrs. J. F. Perkins, Mr. and Mrs. R. B. Benson, and Mr. G. E. J. Nixon. Other Swiss material is mostly from the Geneva museum; while the Paris museum contains the collections of O. Sichel, J. Giraud, J. de Gaulle, and A. Seyrig. The specimens in the de Gaulle collection were mostly without determination labels, and so required re-identification.

I also wish to thank those who have received me in their homes, or in the museums of which they have charge. My visits to Breslau (Wroclaw) were made in 1936 and 1938, and the observations and lectotype selections here recorded were mostly made in the latter year.

I wish to express my particular gratitude to the late Dr. A. Roman, with whom my first real progress in the study of the Ichneumonidae, particularly the Tryphoninae, was made; to Mr. J. F. Perkins, whose incisive comment has frequently illumined the passage of this work; and to Mr. W. R. M. Mason, who is revising the nearctic species, for his co-operation in matters of mutual concern.

Herr Rolf Hinz kindly suggested my incorporating his observations on the biology of three of the species (two of which he had already identified), and was so good as to add that, so placed, they would be most readily found by future workers.

I am indebted to Mr. R. B. Benson for much information on the sawfly hosts of these insects, and on problems of distribution.

I wish to thank Dr. T. H. C. Taylor for reading my manuscript and advising on a number of points, and Mr. N. D. Riley for discussing with me the complicated problems of nomenclature.

Text-figures 1 to 5 and the four beautiful plate figures were drawn by Mr. Arthur Smith, and I wish to express my appreciation of the artist's skill in executing them.

In so far as material studied was captured on an expedition to Finland in 1935, this paper is a result of that expedition, of which the author's costs were defrayed equally by the Royal Society and by the Balfour Managers (Cambridge).

DESCRIPTIVE TERMS

It has been my constant endeavour to avoid descriptive terms that are morphologically inaccurate (e.g. 1942, pp. 43-45). Despite advancing knowledge the difficulty remains, however, that it is still not possible to delimit all morphological areas; and, in any case, the entities of taxonomic significance do not always correspond with the morphological entities. The following points seem to call for comment in introducing this paper.

Considering the facial aspect of the head, writers on Ichneumonidae have termed that part between the median ocellus, eyes, and antennae the 'frons', and that part between the antennae, eyes, and clypeus the 'face'. In 1942 it was proposed to follow Pratt (1940) by substituting 'postfrons' and 'antefrons' respectively: actually, however, Pratt restricted the term 'antefrons' to the more or less raised, median part, and excluded the orbital regions (parafrontals). After consultation with other

specialists working in the British Museum (Nat. Hist.), I now use the terms 'upper face' and 'lower face' respectively, and retain 'epistoma' as part of the latter.

The term 'genal costa' is retained as applied by earlier authors (Thomson, 1873), but 'oral costa' is replaced by the more appropriate 'hypostomal costa' (Michener, 1944). These structures are of particular importance in the Cteniscini.

It was pointed out in 1942 (pp. 43-44) that earlier authors ignored the annellus at the base of the antennal flagellum, and the practice was then started of including it in reckoning the number of flagellar segments. The objection is that it is not always clearly defined in the Braconidae, and it is uncertain whether it should be regarded as a separate segment or as a secondary specialization. I have now agreed with J. F. Perkins to treat the flagellum as having a basal segment composed of an annellus and a postannellus: these, then, together constitute the first flagellar or third antennal segment. An analogous case is that of the trochanterellus, which is regarded by morphologists as a specialized basal part of the femur.

The pair of ventrally placed plates of the prothorax were thought by earlier workers to represent a divided prosternum (Pfankuch, 1919). O. W. Richards, in a paper on the Sphecoid genus *Trypoxylon* (1934), termed such plates the proepisterna; but he tells me it is uncertain whether this is morphologically accurate throughout the higher Hymenoptera, and it seems safer to call them the propleura. It is well known that in higher Hymenoptera the true prosternum is greatly reduced and usually largely concealed.

The main plate of the mesonotum, anterior to the scutellum, was simply termed the mesonotum by earlier workers. A nearer approach to accuracy is now achieved by calling it the mesoscutum, but it must be realized that it includes the mesopre-scutum. This last is supposed by some workers to be the area between the notaulices; but this interpretation cannot be regarded as proven and, in any case, such area is not defined posteriorly.

Snodgrass (1935) introduced the term 'notaulices' as being etymologically more correct than 'notauli', and the present writer adopts this change and also substitutes 'sternaulices' for the old 'sternauli'. The ventral plate of the mesothorax, between the sternaulices, is still termed the mesosternum; for it is necessary to refer to this area, whether it corresponds with the true mesosternum or not.

The 'scutellum metathoracis' has been called by most British systematists the 'postscutellum', a term employed in a different sense by morphologists. The structure is here referred to as the 'metascutellum'.

It has long been realized that there are two body-segments between the mesothorax and the waist; and the use of the term 'propodeum' (or 'propodaeon') for the true first abdominal segment is well-established practice. It may, however, be worth pointing out that the 'area pleuralis', though treated with the propodeum in taxonomic descriptions, seems really to belong to the metapleuron (Pratt, 1940).

The term 'gaster' is again used to include the whole of the body posterior to the propodeum (see Kerrich, 1940b), and thus corresponds exactly with the 'abdomen' of earlier authors. It was termed the 'metasoma' by Michener (1944).

As has been pointed out to me, the 'ovipositor sheaths' (*Bohrerklappen* of German authors) do not always sheath the ovipositor. I continue to refer to these structures

as the 'third valvulae' (Snodgrass, 1935), although this term is not in general use among systematists, and although it has also been pointed out to me that they are not morphologically equivalent to the first and second valvulae.

The term 'nervellus' is applied here, as by most authors, to a transverse vein of the hind wing; and reference is made in descriptions to where it is intercepted by a longitudinal vein above, below, or about in the middle. Morley (1903) applied this term to the longitudinal vein; but he changed this practice in his four succeeding volumes.

The trochanterellus is treated as a separate entity and, in descriptions, is not included in either the trochanter or the femur.

DISCUSSION OF SOME CHARACTERS, AND OF METHODS

Just as, in the main, the terms used in this paper follow those of previous authors, so, in the main, do the characters used in describing species and in separating them; though the attempt is always made to improve the precision with which they are used. Two sets of characters, however, appear to be quite new, and a third set has been greatly developed in comparison with previous work. Some characters are found to be more variable and therefore less valuable than has often been supposed.

It has already been stated that the form of the genal and hypostomal costae is of particular importance in the Cteniscini; and indeed this may apply to the whole form of the gena. The use of these characters was begun by C. G. Thomson and A. Roman; but they did not carry them very far. Recently Townes & Townes (1949) have found them of use, particularly in the genus *Monoblastus*. They did not, however, illustrate them; nor did they find such striking differences as are now disclosed in palaearctic *Exyston* and the two genera most closely related to it. Palaearctic *Smicroplectrus* must be considered as in the majority of cases indeterminable if the hinder gena cannot be viewed.

The shape of the antennal scape does not seem to have been studied previously. This varies to some extent, as do other characters; but I find it of such taxonomic value that the European species of *Anisoctenion* and *Exyston* could almost be determined on their antennal scapes alone. The differences in *Exenterus* are of lesser degree, though very serviceable; but in *Smicroplectrus* there seems to be greater variability, and I cannot use them for diagnosis except in one species.

The development of a pair of piliferous lobes on the anterior angles of the metanotum, recalling the cenchri of sawflies, has not previously been recorded. They are well developed in species of *Exyston* and *Smicroplectrus* studied; whereas in *Cteniscus* and in *Diaborus* auctt. they are represented by much weaker, simple projections, which may to a lesser degree be piliferous. To this extent the character has been used as an aid to generic diagnosis. The same structures are developed in *Exenterus* species, though not so strongly as in *Exyston* and *Smicroplectrus*. Intermediate stages are to be found in *Acrotomus* and *Anisoctenion* which, in this respect, are less consistent than the other genera mentioned.

Holmgren (1858) used the presence or absence of an 'apical' fovea on the scutellum (i.e. as distinct from the normal basal scutellar fovea) three times in the course of his

dichotomous key to the species included in *Exenterus*; and Schmiedeknecht followed by using it to separate two quite large groups of species in *Cteniscus*. The greatest weight assigned to this character was by Davis (1897), who based a new genus *Excavarus* upon an admittedly larger excavation than I have seen in any European insect. Walley (1937) has already discussed this matter, and has shown that *Excavarus* is not a valid genus. No doubt each species has its own measure of weakness of the cuticle of the disk of the scutellum, resulting in a tendency to buckling; and this tendency is sometimes mentioned in descriptions in the present work. It is necessary, however, to find quite other characters for use in dichotomous keys.

It was colour characters that were most used by the older authors to distinguish insect species. Although it has long been recognized that these did not provide a sufficient basis for species discrimination, it is my firm conviction that they should not be rejected out of hand. A colour difference between two forms, if consistent throughout an adequate series of specimens, may indicate that structural differences should be sought. It may often happen that, when two species have been placed in synonymy because they have been found to differ only in one or more apparently trivial colour characters, the synonymized species will have to be reinstated when structural differences have been discovered.

In the present work the coloration of the species has been studied almost as intensively as the structure. My conclusion is that each species, or sex of a species, has a colour pattern that is fundamentally consistent however much it may vary, firstly in the degree of development and the intensity of the brighter colours, secondly in the extent and intensity of infuscation, and thirdly in the intensity of the melanic pigment in the parts of the cuticle that are regularly black or blackish.

Colour characters, then, must be used with discretion. They vary with type of locality, and also quite independently of locality. A character very frequently used in the past has been the presence or absence of a large apical pale mark on the scutellum. This proves consistent in the separation, as good species of *Cteniscus*, of two forms that previously have been treated as varieties; yet such mark may be absent or quite distinct within another species of *Cteniscus* and also within one of the new species of *Smicroplectrus*. When the coloration of a species has been investigated with the aid of adequate material, it can be seen which colour characters are sound, and can be used as additional means of distinguishing the species. When that stage has been reached, it also becomes possible to give probable interpretations of older colour diagnoses, as has also been done in the present paper.

Where proportions are quoted in descriptions, they have been calculated from micrometer measurements. It is surprising how difficult it is to estimate length to breadth accurately by eye, and allowance should on this account be made for possible inaccuracy in older descriptions. The proportions of the petiolar segment have been measured in most of the specimens from which descriptions and redescriptions have been made, particular care being taken not to overlook extreme cases. Proportions of the radial cell have been measured on a fair sample of the specimens, the others then being compared with these.

Figures are drawn from female specimens unless the contrary is stated.

The synonymic tables are not intended to be complete, and for some species are

not given at all. References are given in all cases where the synonymy is new, or has been confirmed by reference to the types; and also in some cases where this is desirable to explain current usage, or where the reference is recent, or contains information to which attention is particularly drawn.

For locality records, the island of Ireland is treated as a single zoo-geographical unit. For other countries the boundaries taken are those that existed in 1937, as in most cases these give the country in which the locality was when the recorded specimen was captured. No political implications should be attached to this procedure.

DISCUSSION OF GENERA

The genus *Anisoctenion* was, as noted by Schmiedeknecht (1911), founded by Förster for species differing from *Acrotomus* in having the clypeus broadly apically rounded and the claws strongly pectinate. He adds that the first character is not sufficient to separate the genera, for the last three species placed in *Acrotomus*, i.e. *rubiginosus* Grav., *binotatus* Thoms., and *parvulus* Thoms., have the clypeus more rounded than truncate; and that, if the second difference is insufficient, then *Anisoctenion* can be united with *Acrotomus*. Certainly this second difference is insufficient, for a number of species placed in *Acrotomus* by Schmiedeknecht have the claws more or less strongly pectinate. However, the form of the clypeus is very characteristic in the *lucidulus*—*succinctus* group. I propose to restrict the genus *Acrotomus* to this group, and to transfer all the other species generally placed in *Acrotomus* to the genus *Anisoctenion* (see below), though *laetus* Grav. may perhaps be considered as a transitional species.

Viereck (1912) designated *lucidulus* Grav. as genotype of *Acrotomus* Hlgr. 1858, but Schmiedeknecht (1911) gives *lucidulus* Hlgr. = *succinctus* Grav. If *lucidulus* Hlgr. is not the same species as *lucidulus* Grav., then *lucidulus* Grav. was not an originally included species, and Viereck's type selection would be invalid. As Roman has already pointed out (1914, 1917), Holmgren had these two species mixed. Roman and I have since (1939) examined Holmgren's specimens, and find that all those of *lucidulus* Grav. are referable to Holmgren's varieties 2 and 3. We selected female and male lectotypes of *lucidulus* Hlgr., specimens from Småland, and these are *succinctus* Grav. as given by Schmiedeknecht.¹

The genera *Exyston* and *Smicroplectrus* have been treated by authors as though very distinct. *Smicroplectrus* has, at least in Europe, been treated as though its species were scarcely to be distinguished except by colour differences, and it was not until 1913 that it was noted by Roman that *quinquecinctus* Grav. has the genal and hypostomal costae strongly elevated as in *Exyston*. It has not previously been noted that *quinquecinctus* Grav. has the epicnemial carina elevated, though much less strongly than in that genus, and that *pratorum* Woldst. (= *brevipetiolatus* Thoms.)

¹ The difficulty that arises over the identity of the type species of *Acrotomus* is due to the misidentification of a species. Such cases were considered by the International Commission on Zoological Nomenclature at its Paris meeting in 1948 (1950, *Bull. Zool. Nomenclature* 4: 158–159, 6th Meeting, minute 38). I therefore propose to invite the Commission to consider this case, and in the meantime to treat *Acrotomus succinctus* Gravenhorst (= *Acrotomus lucidulus* Holmgren, 1858, non Gravenhorst 1829) as the type species of the genus.

has vomeriform third valvulae and finely pectinate claws. The generic characters were found so to intergrade that it proved difficult to decide at which point the species should be separated into genera; in fact, it might have seemed more natural to place the whole series of species into one genus were it not that the extreme forms, *cinctulus* Grav. and *jucundus* Hlgr., would have so little in common. At one time I thought it would be better to restrict the genus *Exyston* to the species with long petiole and simple claws, and to transfer *pratorum* Woldst. to *Smicroplectrus*, which would become characterized by the short petiole and pectinate claws; but the discovery of the species which has proved to be *phaeorrhæus* Hal., and the subsequent examination of *albicinctus* Grav., species largely intermediate between *genalis* and *pratorum*, dispelled this notion. It seems best to erect a new genus for *calcaratus* Thoms. This species has been studied independently, from two Finnish specimens, by Hellén (1944), who suggested that it might be better placed in a separate genus 'die in die Nähe von *Exyston* und *Smicroplectrus* zu stellen wäre', but did not mention the form of the hypostomal costa. Hellén referred to Schmiedeknecht, but the latter's suggestion (1912) was for a genus to contain *pratorum* as well as *calcaratus*.

Walley (1937) considers *Excavarus* Davis not to be a valid genus. He places *E. annulipes* Cress. in *Smicroplectrus* and *E. viticollis* Cress. in *Diaborus* auctt.

Hincks (1944) has most opportunely reopened the question of the status of the names *Cteniscus* (Haliday MSS.) Curtis and *Exenterus* Hartig, and the further question as to whether the two genera, as generally understood by authors, can be maintained as distinct.

It is necessary to dispose of the second question in the first place. As observed by Schmiedeknecht (1911), Holmgren (1858)¹ distinguished only three genera: all species not referable to *Exyston* or *Acrotomus* he placed in *Exenterus*. Förster's work (1868) was modified by Thomson (1883), who produced the first satisfactory table of genera. The citations of Dalla Torre (1901-1902) and of Viereck (1914) were, no doubt, derived more from a study of the literature than of the insects. Hincks, though himself an accomplished student of Ichneumonoidea, has purposely avoided duplicating my study of the Cteniscini, and his citations here and in the 'Check List' (Kloet & Hincks, 1945) are derived from his interpretation of existing literature. Morley (1911: 203) has united the two genera; but I have no hesitation in following Thomson's interpretation and maintaining them as distinct as, in particular, Roman, Schmiedeknecht, and Cushman have done.

Accepting, then, the two genera in the Thomsonian sense, we have to consider the status of the name *Cteniscus*. Hincks writes: 'Personally I am inclined to regard the genus *Cteniscus* as dating from 1832 (Haliday in Curtis), and *C. aurifluus* Haliday is therefore the genotype by original designation.' The same view is implied by Morley (1911: 204).

Haliday published diagnoses of his genus *Cteniscus* and of his three new species in October 1838. Westwood (1840) listed the species and selected *curtisii* Hal. as

¹ Most authors incorrectly quote Holmgren 1855, the date on which this paper was communicated to the Academy. The paper actually appeared in two parts, one included in each of the two parts of the first volume of this series, being the parts issued for the years 1855 and 1856 respectively. The whole volume is dated 1858, which is now quoted as the date of publication.

type. This species has been very little understood: in the present paper its identity is clarified but, as shown below, other events stand prior to its selection as type by Westwood, and earlier by Curtis (1837). It is at the present time reckoned as congeneric with *aurifluus* Hal., but I do not regard it as typical of the genus as a whole. Curtis's selection was an evident oversight, for he had already stated that *aurifluus* was the type, and in any case it was prior to the valid publication of the species then selected.

It is from the second edition of Curtis's *Guide* (1837) that publication of *Cteniscus* Hal. has usually been dated. The genus is there listed (column 98) with the three species subsequently diagnosed (October 1838). Later authors, in thus validating the genus, were, no doubt, under the misapprehension that the diagnoses of the species had been published previously. It appears to me that the publication in Curtis's *Guide*, ed. 2, cannot be valid unless *aurifluus* Hal. can be accepted, with its genus, as valid from 1832. This depends upon whether 'occurs on Willows from July to Sept.' can be accepted as a valid publication of the genus and species. As stated by Hincks (1944), the acceptance of this standpoint would leave the *status quo* undisturbed, and *Cteniscus* would take as genotype by original designation the species *aurifluus* Hal., a distinctive species of the typical general form and colour prevalent in the genus.

Since these considerations were first committed to paper, it has been pointed out to me by W. R. M. Mason, who is studying the New World species of this tribe, that, if the publication of the species *aurifluus* Hal. be not accepted as valid from 1832, the genus *Cteniscus* would nevertheless be validated on the same page by inclusion of the described species *sexlituratus* Grav., which was mentioned as type species by Stephens (1835: 231). We cannot know for certain what species this is until the genus to which it belongs has been adequately revised and a lectotype selection carefully made; for it is possible that Gravenhorst's series was mixed. But we can accept it from Pfankuch (1906: 92) that it is a *Diaborus* Först. Thoms. which, in these circumstances, would have to take the name *Cteniscus*.

The name *Diaborus* is also in question, for, as W. R. M. Mason and later G. Heinrich pointed out to me, the type is *sedulus* Woldstedt 1877 by designation of Viereck (1912). The collection from which this species was described is presumed to be in the Leningrad museum. Schmiedeknecht (1912: 2344) placed the species in *Cteniscus* Thoms. and stated that the male was unknown. My interpretation of the original description is that it was made from not less than one female and two males; and that, though it may refer to some species of *Cteniscus* Thoms. such as *marginatus* Thoms., it contains nothing to preclude *Exyston genalis* Thoms., which is redescribed in the present paper.

Much now depends upon whether *Cteniscus aurifluus* Haliday 1832 can be considered as valid. In the hope that it can, I propose the name **Eudiaborus gen. n.**, with type *pallitarsis* Thomson 1883, for the genus characterized by Thomson (1883: 882, 885) under the name *Diaborus* Först. This name seems appropriate, seeing that Roman (1939) showed that Thomson applied Förster's name to the genus that author actually had.

If *aurifluus* Hal. 1832 be rejected, then the name *Cteniscus* must be transferred to

the genus *Diaborus* Först., Thoms. *non* Woldst., and take as type a species not yet clarified. In that case another name will be required for *Cteniscus* Hal. Thoms. Woldstedt's original material of *sedulus* would have to be examined and a lectotype selected in order to determine whether *Diaborus* Först. Woldst. were correct or not. *Anecphysis* Först., Schmiedeknecht (1911:2281; 1912:2343-2344) might have served, had not Davis (1897) misused the name for a synonym of one of his own species of *Exyston*. But W. R. M. Mason tells me that, from his study of the nearctic fauna, he finds that the species grouped under a certain other genus of Förster, having line priority over *Diaborus*, are not generically separable from *Cteniscus* auctt.; and herein lies a possible alternative solution of the problem.

Since going to press I see that Mason has now (1951 April: 227) published his acceptance of *Cteniscus* Haliday as valid from 1832, and has duly placed *Eridolius* Förster in synonymy with the genus used in this sense (type *Ct. aurifluus* Hal.). He earlier wrote to me (*in litt.*) that he would not regard *pygmaeus* Hlgr., type species of *Eridolius* Först., as a satisfactory type species of the whole genus as he now understands it.

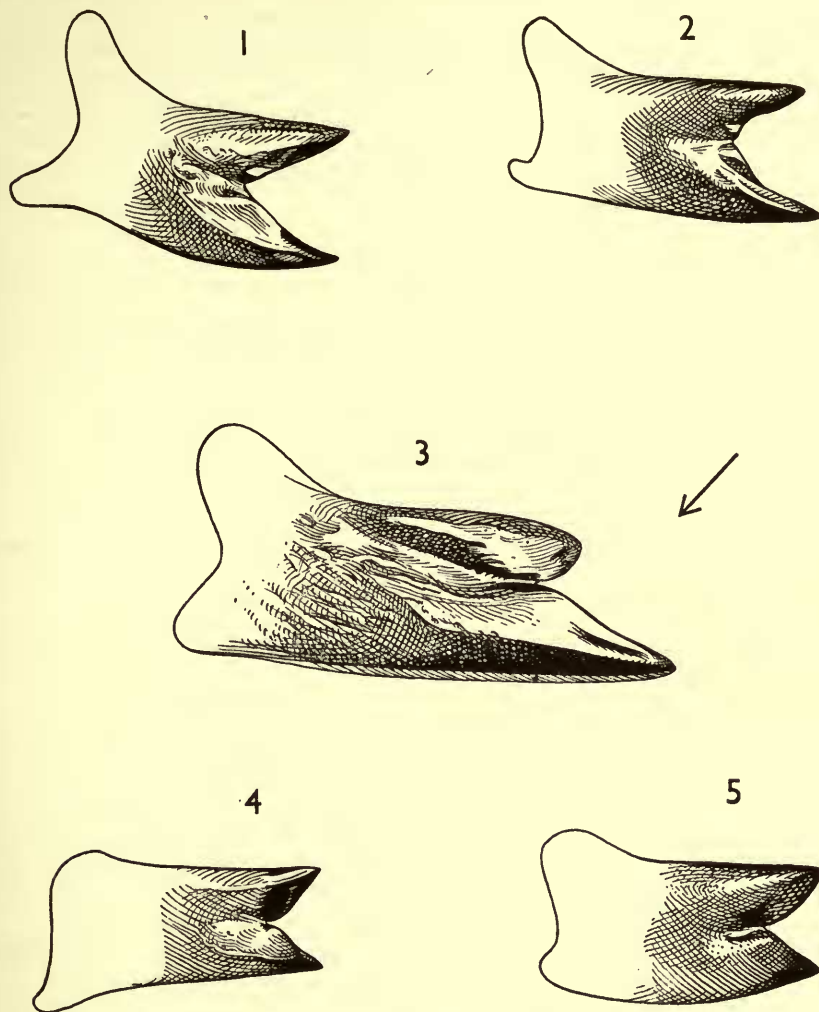
The action of Stephens (1835) in citing *Tryphon sexlituratus* Grav. 1829 as type of *Cteniscus* has never been followed, and to adopt this usage now would cause great confusion. All things considered, I propose to invite the International Commission on Zoological Nomenclature, by the exercise of their plenary powers, to set aside the citations by Stephens of *sexlituratus* Grav. and by Westwood and Viereck of *curtisii* Hal., and either to confirm *Cteniscus aurifluus* Haliday in Curtis 1832, or alternatively to select *aurifluus* Haliday 1838 as type species of *Cteniscus* Curtis 1832. Meanwhile I intend to continue the use of *Cteniscus* in that generally accepted sense.

Reasons are adduced below for placing all interpretations of *Picroscopus* in synonymy with *Exenterus*. It is also open to question whether '*Tricamptus*' *apiarius* Grav. merits generic separation; but, beside the distinctive appearance, there may be a biological difference in this case. The species of *Exenterus*, as that genus has recently been constituted, are all, so far as is known, parasites of Diprionidae, while *apiarius* has been recorded by Forsius (1911) as occupied with full-grown larvae of *Croesus septentrionalis* L. (Nematinae). I was prepared to maintain this species in a distinct genus so long as I believed such genus to have a valid name; but, as shown on another page, the name *Tricamptus* Först. must be applied to *pratorum* Woldst. (*Exyston*). I do not, however, think it opportune to propose a new generic name, and therefore replace the species in *Exenterus* where Schiødte and Holmgren had it.

KEY TO GENERA OF CTENISCINI

1. Lower mandibular tooth distinctly larger and more prominent than upper, and usually much longer (Figs. 1-3). 2
 Mandibular teeth sub-equal (Figs. 4, 5) 3
2. Clypeus almost pentagonal, not strongly transverse; apically sub-truncate or, rather, broadly and shallowly emarginate between the distinct apical angles (Figs. 6, 7) *Acrotomus* Hlgr.

Clypeus sub-elliptical, strongly transverse; apically more or less rounded, rarely at all emarginate and not apically angulate (Figs. 8, 9) *Anisoctenion* Först.



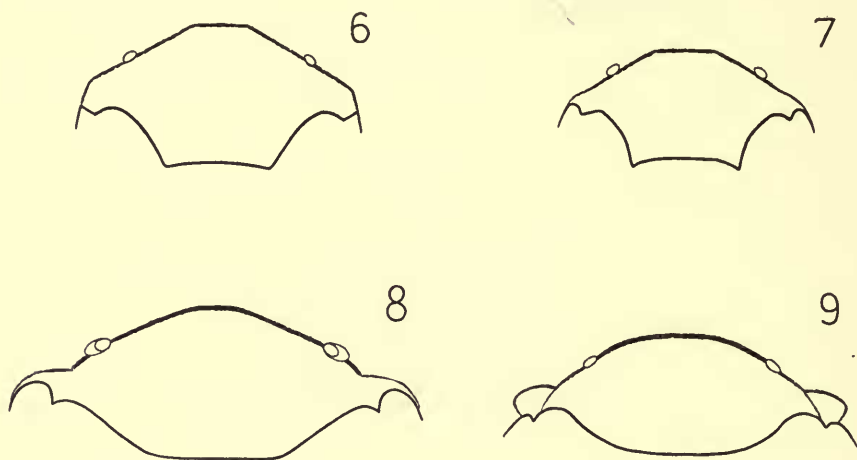
FIGS. 1-5. Right mandible of Fig. 1. *Acrotomus succinctus* Grav. Fig. 2. *Anisoctenion pumilio* Hlgr. Fig. 3. *Anisoctenion triangulatorius* Grav. Fig. 4. *Cteniscus gnathoxanthus* Grav. Fig. 5. *Cteniscus aurifluus* Hal. Drawn by Mr. Arthur Smith. As indicated by the arrow, the direction of illumination for these five figures is half right, not half left.

3. Area superomedia transverse, generally distinctly so: body rather coarsely, and for the most part closely punctate; in particular, the vertical region and temples of the head are more or less coarsely punctate: hind tibia without, or with a very minute spur, much shorter than one-third the breadth of the tibia where it issues: propodeum and first two segments of gaster usually distinctly rugose

(Pl. 4): gaster generally thick-set and often broadly bright yellow-banded

Exenterus Hartig

Area superomedia very seldom transverse: body rather finely, and generally for the most part sparsely punctate; in particular, the vertical region and temples of the head are more or less finely punctate: in case of doubt the hind tibia almost always bearing a short spur, whose length is about one-third the breadth of the tibia where it issues: propodeum and first two segments of gaster usually coriaceous or shining (Pls. 5, 6, 7), at most partly finely rugulose, or very seldom in large part distinctly rugose: gaster generally not thick-set and not broadly bright yellow-banded 4



FIGS. 6-9. Clypeus of Fig. 6. *Acrotomus lucidulus* Grav. Fig. 7. *Acrotomus succinctus* Grav. Fig. 8. *Anisoctenion laticeps* Grav. Fig. 9. *Anisoctenion alacer* Grav.

4. Body strongly hairy: hypostomal costa almost always strongly raised: metathorax with anterior angles raised to form a pair of piliferous lobes (recalling the cenchri of sawflies). Hind tibia often bearing a short spur: genal costa and epicnemial carina strongly raised in most non-spurred species 5
 Body not strongly hairy: hypostomal costa not strongly raised: metathorax without such piliferous lobes. Hind tibia without a spur: genal costa and epicnemial carina not strongly raised. 7
5. Head and thorax rather coarsely and irregularly, and also somewhat sparsely, hairy: petiolar segment often markedly elongate and narrowed: epicnemial carina strongly raised: hind tibia without a spur in all known palaearctic species (Pl. 5) *Exyston* Schiødte
 Head and thorax finely and regularly, and also more densely, hairy: petiolar segment not markedly elongate and narrowed: hind tibia with a short spur in most species (Fig. 62, p. 398) 6
6. Hypostomal costae curved inwards, almost meeting behind mouth-parts (Fig. 59, p. 393) *Parexyston* gen. n.

- Hypostomal costae not nearly meeting behind mouth-parts: epicnemial carina sometimes distinctly, but never strongly raised . . . *Smicroplectrus* Thoms.
7. Tergite II with a pair of well-defined diagonal impressed furrows at base
 *Eudiaborus* gen. nov.
 Tergite II without such well-defined furrows 8
8. Fore wing with areolet closed *Cteniscus* (Hal. MSS.) Curt., Thoms.
 Fore wing with areolet open *Eridolius* Först.

The above table of genera attempts to achieve, so far as possible, a natural classification. I maintain the opinion that a fuller understanding of the genera and species should precede the construction of a 'practical' key of a simpler and more artificial nature, designed for speedier identifications.

It will be seen that the separation of the genera is not such an easy matter as may appear at first sight. They are based on groups of species with striking combinations of characters, yet the species will not all fall easily into watertight compartments. The genera represent, rather, aggregates of species with the tendency to possess such combination of characters. In each main genus there are one or more species which approach the unspecialized *Cteniscus* type: *pumilio* Hlgr. in *Anisoctenion*, *pratorum* Woldst. in *Exyston*, *ictericus* Grav. in *Exenterus*, and *jucundus* Hlgr. in *Smicroplectrus*. Conversely, the male of *Cteniscus hofferi* Gregor approaches *Diaborus* auctt., while *Ct. uncinatus* Hlgr. is decidedly suggestive of *Acrotomus*.

Genus *ACROTOMUS* Holmgren

1858 *Acrotomus* Holmgren, *Svensk Vet.-Akad. Handl.* 1: 222.

In this genus as now restricted (see pp. 313, 316) I can, at present, distinguish only two species, *lucidulus* Grav. and *succinctus* Grav.

Roman (1914: 2-3) synonymized *sexcinctus* Grav. and *auriculatus* Thoms. with *lucidulus* Grav. An intensive study of large material from diverse localities should reveal whether any valid differences exist. My study of a number of very variable species within the tribe leads me to expect that all the material I have seen in this particular aggregate will fall within the range of variation of a single species; but at the present stage the concept is being left as that of an aggregate species.

Hellén (1941: 48) doubted the synonymy of *auriculatus* Thoms., and recorded under that name a male specimen which he characterized, and which he compared with *triangulatorius* Grav., a species that has not, till now, been well understood, at least under that name (see p. 323). He most kindly sent me this recorded specimen on loan, which has enabled me to establish that it does belong to the *lucidulus* aggregate.

The identity of *sexcinctus* Grav. Morley is also established in the present paper (see p. 336). See also my supplement, p. 452 below.

A. succinctus Grav. is abundantly distinct from the *lucidulus* aggregate, and can be recognized with the aid of the following table:

succinctus Grav.*lucidulus* Grav. agg.

Clypeus (see Fig. 7)

Clypeus (see Fig. 6)

Antennae scarcely incrassate, with scape elongate and slender (Fig. 11).

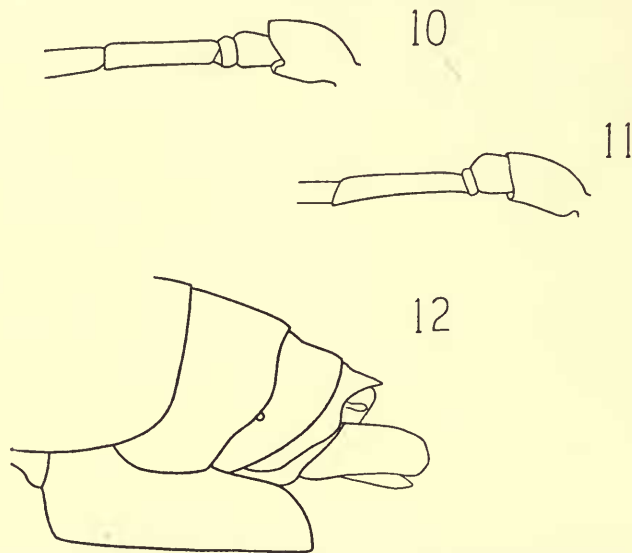
Antennae distinctly incrassate, with scape shorter, stouter, and sharply incised (Fig. 10).

Notaulices extending to middle of mesoscutum, though indistinctly.

Notaulices generally short.

Petiolar segment without distinct basal lobes; less strongly transversely impressed in apical third.

Petiolar segment with basal lobes strong; more strongly transversely impressed in apical third.



FIGS. 10-12. Fig. 10. Left antennal scape and following segments, in sinistro-lateral view, of *Acrotomus lucidulus* Grav., drawn from a specimen compared with the type series in 1936. Fig. 11. The same of *Acrotomus succinctus* Grav. Fig. 12. Apical segments of gaster of *Acrotomus succinctus* Grav. in similar view.

Female hypopygium sharply folded mid-ventrally, at least in apical quarter.

Female hypopygium broader, not folded mid-ventrally, terminating in a short point.

Female third valvulae narrow in lateral and in ventral view; projecting strongly beyond apex of tergite 8 (Fig. 12).

Female third valvulae broad in ventral view, and densely hairy beneath; not or very little projecting beyond apex of tergite 8.

Male gaster clearly pale yellow in lateral view, before the reflexed lateral margins of the tergites.

Male gaster seldom pale yellow laterally, generally in ventral view only, apart from the hind margins of the tergites.

***Acrotomus lucidulus* Gravenhorst**

Pfankuch (1906: 93) states that there are two females in the Gravenhorst collection: this is correct if intended to exclude the 'varieties'. Of these two I select as lectotype the specimen in which the pronotum does not appear to have a continuous antero-

lateral yellow margin: the first in the collection. Pfankuch states 'Var. 2 fehlt', but, though not so labelled, two specimens are present.

I have specimens of this species compared with the Gravenhorst material in 1938.

Specimens of the aggregate species seen from England, Belgium, Norway, Sweden, Finland, Spain, France, Switzerland, and Germany. Also reliably recorded from Holland (Teunissen, 1948) and Czechoslovakia (Gregor, 1929).

Biology: ENGLAND, Beds., Luton, 1 ♂ em. vii.1940, ex larva of *Cladius difformis* Panz. (larva 20.vi.1940), V. H. Chambers. This confirms the records of Brischke and de Gaulle. Brischke's record of *sexcinctus* Grav. from the Danzig district, and of the breeding of it from *Hemichroa australis* Lep. (= *alni* auctt. non L.), quoted by Morley and Schmiedeknecht under *Acrotomus*, is very likely to refer to *Cteniscus curtisii* Hal. (see p. 426 below).

***Acrotomus succinctus* Gravenhorst**

1829 *Tryphon succinctus* Gravenhorst, *Ichneumonologia Europaea*, 2: 166-167 (non *Exenterus succinctus* Holmgren, 1858, see p. 421 below).

1883 *Delotomus lucidulus* Thomson, *Opuscula Entomologica*, fasc. 9: 884 (non Gravenhorst, 1829).

1906 *Acrotomus succinctus* Pfankuch, *Z. Hym. Dipt.* 6: 94-95.

Mandible (Fig. 1).

In the Gravenhorst collection I select as lectotype the male specimen corresponding to the description of 'Individui prope Barterodam' (this locality is in Hannover province).

There is no doubt that Thomson's description refers to *succinctus* Grav., though there is also a female of the true *lucidulus* in his series from Pålshö.

I have a pair of specimens given me by Rektor Hedwig and compared with the Gravenhorst material in 1938.

Specimens seen from Ireland (numerous, from several counties), England, Belgium, Sweden, Finland, France, Switzerland, Germany, Austria. Also reliably recorded from Holland (Teunissen, 1948) and Czechoslovakia (Gregor, 1929).

Genus *ANISOCTENION* Förster

1868 *Anisoctenion* Förster, *Verh. naturh. Ver. preuss. Rheinl.* 25: 194.

***Anisoctenion yakui* Uchida**

1932 *Acrotomus yakui* Uchida, *Ins. Mats.* 6 (4): 163+pl. v, fig. 12.

Female. Head moderately narrowed and rounded behind eyes; rather shallowly emarginate behind: on vertical region and temples moderately and rather closely punctate, sparsely so on genae except near mandibular base: upper face moderately, rather closely and sharply punctate in middle, more sparsely so at sides: lower face closely and rather coarsely punctate, with epistoma scarcely convex. Cheeks short and not at all buccate. Clypeus distinctly alutaceous, rather sparsely beset with punctures of mixed sizes, fine to coarse; sharply delimited basally; weakly convex; slightly impressed just before the moderately rounded apex. Malar space very short, less than half width of pedicellus below. Hypostomal costa weakly raised: genal

costa scarcely raised, meeting it some way behind mandibular base, farther behind than distance between mandibular apices.

Antennae with scape (Fig. 26) rather elongate, moderately excised externo-ventrally; with postannellus 1.6 times length of following segment; with flagellum stout, filiform, 34-segmented.

Pronotum very little raised before dorsal transverse furrow which is narrow, irregular, and shallow; with epomiaae very weak; laterally rather finely, shallowly and confusedly punctate above, longitudinally rugose below. Propleura finely and closely punctate. Mesoscutum moderately and rather evenly convex; with notaulices moderately impressed, not sharp but broad and finely rugose; moderately punctate discally, more finely so peripherally. Scutellum very strongly convex; margined to about middle, rather finely punctate except on elevated centre. Mesopleura closely and rather coarsely punctate below, moderately so anteriorly above, and with an extensive speculum: sternalices broad but superficial: mesosternum almost flat, rather finely and closely punctate in front, finely and more sparsely so behind: mesolcus narrow and weakly impressed, closed behind: prepectus closely rugose-punctate: epicnemial carina very weakly raised. Propodeum long, scarcely raised from in front and not at all sharply declived; finely punctate above, obsoletely rugose behind; on area pleuralis rather closely punctate, rather finely so above, moderately so below: area posteromedia transverse but not strongly so, extending a good third the way forward, with a percurrent median costa: area superomedia narrow, very much longer than its greatest breadth, expanded to where it emits costulae before middle, not sharply delimited basally.

Petiolar segment 2.6 times length of its greatest breadth; almost regularly explanate from near base to near apex; laterally weakly margined, but with spiracular tubercles rather prominent; without distinct dorsal keels, but medially raised in anterior half and with a median impression behind; rather finely, closely and shallowly punctate. Tergite 2 with thyridia conspicuous, very little broader than long, and widely separated; finely and closely punctate in basal half: gaster more and more finely and sparsely punctate toward apex. Female hypopygium sharply folded mid-ventrally. Female third valvulae rather narrow, with ventral margin slightly sinuate and decurved, projecting strongly beyond apex of tergite 8 (as in *triangulatorius* Grav., Fig. 15).

Fore wings with basal and disco-cubital veins parallel; with stigma and radial cell unusually elongate; with areolet sub-petiolate; with nervus parallelus emitted about in middle of brachial cell. Hind wings with nervellus slightly antefurcal, intercepted a little below middle.

Hind tibiae slender in about basal two-thirds, thereafter strongly expanded to apex. Tarsal claws moderately and rather regularly pectinate, but not to near apex of claw.

Length 9 mm.

Head black, with the following parts deep, bright flavous margined with fulvous: mouth-parts except mandibular apices, clypeus, lower face except for a median mark above, and a small mark between eye and mandibular base: clypeo-frontal suture dark. Antennae pale ferrugineous above, merging to fulvous in apical half; bright

flavous below, merging to fulvous beyond post-annellus; with annellus and extreme base of postannellus pale all round. Thorax and propodeum black, with mark below fore wings and conspicuous marks on apical half of scutellum and on metascutellum bright flavous; with hind margins of scutellum and metascutellum obscurely pale: tegulae mainly stramineous. Fore and mid coxae, trochanters and trochanterelli pale flavous, the coxae dark at base: the remaining segments of these legs weakly rufescent: hind coxae, trochanters and trochanterelli flavous; with coxae at base and in part on outer side, and trochanters and trochanterelli above, blackish margined with fulvous: hind femora, tibiae and tarsi rufous, with the following blackened—femora weakly at base and above, tibiae more strongly above, and first four tarsal segments except at base and apex. Gaster with tergites 1 and 2 black, pale along hind margin and with a conspicuous pale spot near mid apex; with thyridia pale; with remaining tergites rufous, but tergite 3 infuscate in about basal half.

Redescribed from the holotype ♀ kindly sent me on loan by Professor Uchida: JAPAN, Hokkaido, Sapporo, ♀, 15.vi.1929, H. Yaku.

According to the original description, the male differs as follows—cheeks yellow: scutellum and metascutellum yellow only at apex: hind coxae and femora almost black, the coxae yellowish at apex: gaster almost black, the tergites with pale apical margins.

In the general colouring, shape of head, form of clypeus, short malar space, stout flagellum, form of propodeum, petiolar segment, and female third valvulae this species appears most closely related to *triangulatorius* Grav.; but it differs in not having the hypostomal costa sharply raised nor the tarsal claws strongly pectinate. It shares with *ridibundus* Grav. and *pronotalis* nov. the character of having the hypopygium sharply folded mid-ventrally. For the cheeks to be yellow in the male but only with a small yellow spot between eye and mandibular base in the female is very peculiar in the Cteniscini.

Anisoctenion triangulatorius Gravenhorst

1829 *Tryphon triangulatorius* Gravenhorst, *Ichneumonologia Europaea*, 2: 205–206.

1835 *Tryphon mesoleptoides* Stephens, *Illustrations of British Entomology: Mandibulata*, 7: 245, syn. n.

1858 *Acrotomus coarctatus* Holmgren, *Svensk Vet.-Akad. Handl.* 1: 224–225.

1906 *Acrotomus triangulatorius* (Grav. non Hlgr., ♀ non ♂) Pfanckuch, *Z. Hym. Dipt.* 6: 222–223.

The following notes and description of *triangulatorius* Grav. and the freehand drawings (reproduced as Figs. 13–15) were made in Breslau in August 1938:

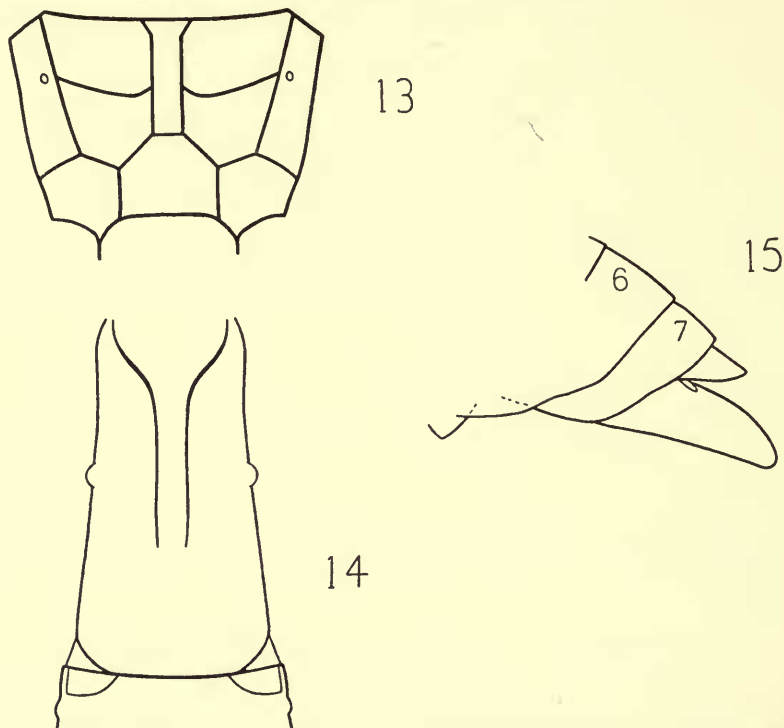
'I select as lectotype the specimen corresponding to Gravenhorst's colour description, a female, which is placed third in the collection. The allotype is placed eighth. Two other males in the collection differ from the above in having the propodeum rather shining; with strong costulae; with area superomedia not nearly parallel-sided: these would agree with specimens typically placed as *coarctatus* Hlgr.

'*Lectotype and allotype*:—Head slightly narrowed behind eyes, rather weakly emarginate behind. Vertex moderately finely and densely punctate, with strong impressions lateral to the lateral ocelli: face moderately coarsely and densely punctate, not shining. Clypeus coarsely punctate, apically sparsely so; very deeply

delimited from face; apically almost truncate; moderately projecting when seen in side view. Lower mandibular tooth much longer than upper. Oral costa strongly raised where met by genal costa. Cheeks very short.

'Antennae with scape oval, scarcely one and a half times as long as broad; post-annellus curved as in *laticeps* (Grav.) Thoms.

'Pronotum above and mesoscutum finely and densely punctate; pronotum coarsely longitudinally rugose below; notaulices moderately strongly impressed, reaching



FIGS. 13-15. Figures drawn freehand in Breslau in 1938 from type of *Anisoctenion triangulatus* Grav. Fig. 13. Propodeum. Fig. 14. Petiolar segment, with base of following. Fig. 15. Apex of gaster, in sinistro-lateral view.

middle of mesoscutum. Scutellum moderately raised, not margined to middle. Mesopleura strongly punctate, with a large shining speculum: epicnemial slightly raised: mesolcus deeply impressed. Propodeum densely punctate and rather dull: area petiolaris finely rugose: area superomedia almost parallel-sided and almost three times as long as broad; costulae very weak.

'Petiolar segment more than twice as long as broad; with prominent spiracles and moderately strong keels; strongly punctate and not shining except at apex. Thyridia large, about half width of space between them (very slightly foreshortened in figure). Third valvulae rather strongly projecting, strongly hairy.

'Radius curved at apex.

'Tarsal claws strongly pectinate in both sexes.'

I have compared with this description long series of specimens, principally in the British Museum and Manchester Museum collections, named as *mesoleptoides* Steph. or *coarctatus* Hlgr., including the type of *mesoleptoides* and can find no satisfactory separation.

Schmiedeknecht (1911: 2285) separated *triangulatorius* and *coarctatus* as follows:

Gaster black: segments 2 and 3 red or brown-red or blackish with red incisures.

Propodeum with 5 distinct upper areae *coarctatus* Hlgr.

Segments 1 and 2 or 1-3 black, their hind borders and the remaining segments red.

Propodeum shining: costula absent or weak *triangulatorius* Grav.

Habermehl (1925) recorded different specimens under the names *triangulatorius* and *coarctatus*, but there is no evidence that he ever compared them, and I do not know of any record published by Pfankuch under either of the two later names. Schmiedeknecht (1911: 2291) merely quoted Pfankuch's description of *triangulatorius*. In the L. A. Carr duplicate collection there is a specimen labelled as having been determined by Schmiedeknecht as *coarctatus*, but which would run down better in his key to *triangulatorius*: it agrees with my description of *triangulatorius* except for the shape of the area superomedia, which has the lateral costae strongly divergent from base to middle. Indeed, the area superomedia is seldom at all nearly parallel-sided, at least in English specimens: yet that is one of the characters that is variable. I have examined two female specimens from the same locality in Sweden (Skåne, Höör district, vi.1938, D. M. S. and J. F. Perkins) in which the area superomedia is to be described as very nearly parallel-sided: in one the costula is to be described as very weak, and in the other it is not. I now feel confident that we are dealing with a single species which is variable, *inter alia*, in the shape of the area superomedia, the strength of the areolation of the propodeum, the prominence of the keels and spiracular tubercles of the petiolar segment, the convexity of the scutellum and even, within the limits of its general form, of the shape of the clypeus.

The species is now described as follows.

Head slightly narrowed and rounded behind eyes, though sometimes more strongly so in smaller specimens; broadly and shallowly emarginate behind: vertical region and temples rather strongly and densely punctate, cheeks confluent so just above mandibular base: lower and upper face strongly and densely punctate, lower face almost confluent so just below scrobes, and upper face somewhat transversely rugose-punctate. Clypeus strongly transverse; coarsely punctate, sparsely so in lower half; very deeply delimited basally; with apical margin not broadly rounded but strongly depressed below the tentorial pits, and more or less nearly truncate in middle; not strongly convex, shallowly impressed before apical margin. Malar space very short, shorter than basal breadth of front metatarsus. Where met by genal costa, the hypostomal costa is strongly raised, often at an acute angle. Genal costa inflected: gena almost angulate behind lower base of mandible. Mandible with lower tooth very much longer and stronger than upper (Fig. 3).

Antennae elongate, not much attenuate to apex; with scape (Fig. 27) short, globose, weakly excised; with postannellus distinctly curved; with flagellum 32- to 36-segmented.

Pronotum with epomiae sharp and strong; behind them finely to moderately and rather closely punctate above, more or less strongly longitudinally rugose below. Propleura shining, shallowly and finely punctate, more coarsely so anteriorly. Mesoscutum normally convex anteriorly; with notaulices moderately, sometimes rather sharply, impressed; moderately punctate discally, more finely and densely so laterally and anteriorly. Scutellum not strongly convex; seldom margined to middle; very finely punctate at sides and almost impunctate above and behind. Mesopleura with a shining speculum; moderately punctate anteriorly above, strongly and, in part, almost confluent so below: sternalices not deeply, though sometimes rather sharply impressed: mesosternum rather finely and densely punctate; prepectus rugose-punctate: epicnemial carina very slightly elevated: mesolcus narrow and sharply impressed, closed behind. Propodeum more or less finely punctate above, with area pleuralis more strongly so, rugose-punctate to finely rugose behind; with costae weak or rather weak, the hindmost the strongest, with costulae generally complete but sometimes more or less obsolete: area basalis not delimited apically: area superomedia sometimes more or less parallel-sided, more often distinctly contracted from middle to base: a triangular vestige of the area interna (Thomson, 1873, fasc. 5, pl. fig. 16) is often present.

Petiolear segment elongate, 1.9 to 2.3 times length of its greatest breadth in female, 2.1 to 2.7 times in male; laterally sharply margined; with dorsal keels distinct to beyond middle, often strong; with spiracular tubercles more or less prominent; in basal half indeterminately rugose-punctate, in apical half rather strongly punctate, sometimes rugose-punctate; apically smooth and shining in middle. Tergite 2 with thyridia very distinct, not more than twice as broad as long. Remainder of gaster more and more finely punctate towards apex. Female third valvulae rather strongly projecting, decurved (usually more distinctly than is indicated by Fig. 15).

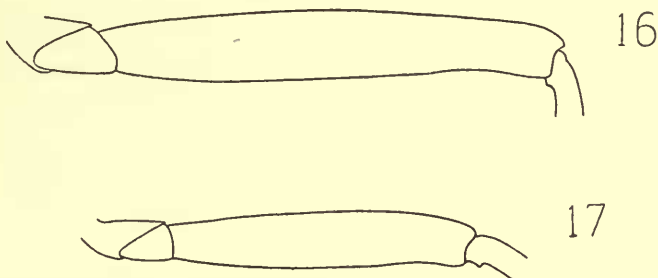
Fore wings with basal and disco-cubital veins parallel, or even slightly convergent to point of ramellus; with radius upcurved at apex; with areolet usually shortly petiolate but sometimes with a long petiole; with nervus parallelus emitted somewhat below middle of branchial cell. Hind wings with nervellus slightly antefurcal and intercepted below middle.

Legs rather slender, though with femora rather short (Fig. 17). Claws of all tarsi very strongly pectinate.

Length 7 to 11 mm.

Head black or blue-black, with the following parts deep bright flavous; occasionally paler: longitudinal marks near apices of genae, sometimes wanting, clypeus except marginally, and lower face with two large, triangular marks. These marks extend along the orbits and in one specimen are confluent below; but normally they reduce the black on the lower face to parts below the outer margins of the scrobes and a medial, more or less triangular part, which is often more nearly parallel-sided above. Mandibles pale stramineous, occasionally brighter, merging to almost black near apex. Palpi dull fulvous. Antennae with flagellum fulvo-testaceous, darker above towards base; with annellus generally entirely pale; with scape and pedicellus black above, below more or less obscurely pale in female and pale flavous in male. Thorax and propodeum black, with humeral angle of pronotum and occasionally

a small mark below base of fore wing pale; with tegulae stramineous to pale flavous; with large apical marks of scutellum and metascutellum bright flavous. Legs of female with coxae and trochanters black or brownish, almost always pale at apex, except for the hind coxae which are generally totally black: fore and mid trochanterelli, femora, tibiae and tarsi dull flavous, the femora in large part nearer fulvous and the mid tarsi sometimes darkened: hind legs beyond the trochanters more or less rufous, sometimes paler, often almost black, especially above; hind tibiae, however, always pale flavous at base. The male differs in having the fore and mid legs flavous, except for the dark coxal bases, the femora scarcely tending to fulvous: the hind trochanterelli are more or less flavous. Wings with veins and stigma ferrugineous to deep fuscous, basally dull flavous. Petiolar segment black. Remainder of gaster



FIGS. 16-17. Left hind femur, in sinistral-lateral view, of Fig. 16. *Anisoctenion alacer* Grav.
Fig. 17. *Anisoctenion triangulatorius* Grav.

varying from rufous, with the hinder tergites indefinitely infusate in part, to black, with only the thyridia, broad margins of tergites 2 and 3, and very narrow margins of remaining tergites rufous, and the sternites mainly rufo-testaceous: typically tergites 2 and 3 and the genitalia are more or less rufous, and the male is the darker sex.

Redescribed from the following material: IRELAND, Co. W. Mayo, Old Head, 1 ♂, 21.v.1942; Co. Wicklow, Devil's Glen, 1 ♀, 23.vi.1929, Glenmore Castle, 1 ♀, 16.vi.1934, Powerscourt Demesne, 2 ♂♂, 25.v.1932, on oak, Powerscourt Deerpark, 2 ♂♂, 27.v.1932, on oak, A. W. Stelfox: ENGLAND, unlocalized, 1 ♀, 2 ♂♂; Essex, Colchester, 1 ♀, 3.vi.1909, Harwood; Staffs., Lichfield district, 9 ♀♀, 6 ♂♂, L. A. Carr; Yorks., Grassington, 1 ♂, 19.v.1945, Beedale, 1 ♀, 9.vi.1945, W. D. Hincks: SWEDEN, Skåne, Höör district, 2 ♀♀, 2-17.vi.1938, D. M. S. & J. F. Perkins: CZECHOSLOVAKIA, Aussig on Elbe, 1 ♂, 18.v.1930, Th. Kupka.

The lectotype ♀ and allotype of *coarctatus* Hlgr., 'in Bahusia' (SWEDEN, Bohuslän), C. Boheman, have been compared and found to agree with the above description and a few of the specimens from which it was made.

Further material seen: ENGLAND, &c., 31 specimens in British Museum collection, including the Stephens type; Surrey, Dorking, Ranmore, 1 ♀, 18.v.1948, G. J. K.: BELGIUM, unlocalized, 2 ♂♂, C. Wesmael; Vivier d'Oie, 2 ♂♂, J. Tosquinet: HOLLAND, Venlo, Daeden, Plasmolen, 3 ♂♂, 4 ♀♀, H. G. M. Teunissen: FRANCE, Maisons Laffitte, St. Cloud, &c., 26.iv-29.v., J. de Gaulle; Haut-Rhin, Wattwiller, A. Seyrig (altogether 22 ♂♂, 10 ♀♀ in Paris Museum): GERMANY, material in Gravenhorst collection;

Stolzenau, 1 ♀, 13.v.1945, Hannover, 1 ♂, 14.v.1948, 1 ♀, 15.v.1948, R. Hinz; Schwerin, 1 ♂, 14.v.1882, 1 ♂, 17.v.1884, S. Brauns.

Biology. Herr Rolf Hinz has observed this species flying together with *Tryphon compunctor* Grav. from the beginning to the middle of May, and that both species parasitize larvae of *Apythemus serotinus* Müll. living on oak. He found the females hunting for larvae that had crawled into cracks in the bark or into the foliage for their last larval ecdysis.

Anisoctenion rubiginosus Gravenhorst

1829 *Tryphon rubiginosus* Gravenhorst, *Ichneumonologia Europaea*, 2: 145.

1858 *Acrotomus insidiator* Holmgren, *Svensk Vet.-Akad. Handl.* 1: 224 (placed in synonymy with *rubiginosus* Grav. by Pfankuch, 1906).

1858 *Exenterus morio* Holmgren, *Svensk Vet.-Akad. Handl.* 1: 233 (placed in genus *Cteniscus* by Schmiedeknecht, 1912), **syn. n.**

1883 *Delotomus binotatus* Thomson, *Opuscula Entomologica*, fasc. 9: 886 (placed as a variety of *rubiginosus* Grav. by Gregor, 1929, by authorization of A. Roman).

1883 *Delotomus parvulus* Thomson, *Opuscula Entomologica*, fasc. 9: 886, **syn. n.**

1906 *Acrotomus rubiginosus* Pfankuch, *Z. Hym. Dipt.* 6: 90-91.

1937 *Acrotomus binotatus* Hellén, *Notul. Ent.* 17: 124 (*non parvulus* Hellén, 1941).

The following notes were made in Breslau in August 1938:

'*rubiginosus* Grav. I select the male specimen in the Gravenhorst collection as lectotype, as Pfankuch has already done by implication. In addition to the characters given by Schmiedeknecht, I have noted the following: head of female broadened behind eyes. Face with a strong longitudinal impression lateral to each scrobe: clypeus finely transversely impressed in apical half. Epicnemial moderately strongly raised, scarcely incised medially. Petiolar segment finely aciculate-punctate, scarcely shining, slightly broadened near base. Radialis II sinuate. Tarsal claws weakly and irregularly pectinate. Third valvulae finely hairy, with ventral margin sinuate, decurved.'

I do not think that anyone will quarrel with Roman's selection of a female lectotype of *insidiator* Hlgr.; nor with my own selection as lectotype of *binotatus* Thoms., from the three female specimens thus placed in the Thomson collection, of that one with best developed black spots on tergite 2 and most nearly sessile areolet. The situation regarding the other two names is more involved.

In the Swedish collection in the Stockholm museum stand the following specimens, all taken by Boheman and labelled *morio* Holmgren: 1 ♂ from Stockholm and 1 ♂ from Lapland, each labelled 'Typus', one ♂ from Stockholm labelled 'Allot.', and 1 ♀ from Lapland labelled 'Parat.' I think the male specimen from Stockholm labelled 'Typus' should be considered as the holotype. I believe that the transfer of *morio* Hlgr. from the genus *Cteniscus* has not previously been published; and I dissent from the opinion of Roman (1914: 16) regarding it.

In the Thomson collection, under *parvulus* Thoms., there stand two specimens. The second is a female from Farhult in Skåne, which I have determined as *pumilio* Hlgr.: it is evidently one of the specimens to which Thomson referred on p. 1255. It

does not run to the species-group of *binotatus* in Thomson's key, and I reject it from consideration in this connexion.

The first specimen is a diminutive female, about 5 mm. in length, belonging to this species-group but labelled 'Scan' (= Skåne). The fourth and last specimen under *binotatus* is a male from Östergötland; it fits the diagnosis of *parvulus* about equally well, except that it is not notably smaller than the first three (female) specimens. I prefer to leave open, at the present time, the choice between either of these two specimens, or the possibility that the type is lost.

In all the material now examined, I can find very little divergence from the characters noted in Breslau. In some specimens the epicnemial carina is strongly incised medially: I should now describe it as strongly elevated between the sternaulices, in front of which a blunt angulation of the prepectus suggests a lateral closing of the coxal cavities. The sculpture of the petiolar segment I should now describe as rugulose-punctate, though the rugulosities are sometimes so regularly longitudinal as to suggest aciculation. The degree of development of the keels of the petiolar segment is decidedly variable. The decurving of the ventral margin of the third valvulae is less marked in smaller specimens. The diminutive female standing under *parvulus* in the Thomson collection is of lighter body-colour, and has the head appreciably narrowed behind the eyes, a condition that might be expected in an ill-nourished individual. But I cannot find any convincing specific separation. Having made the redescription given below, I feel satisfied that we are dealing with a single, variable species.

Head generally a little broadened behind eyes, particularly in female, in larger specimens strongly so; distinctly longer behind eyes than eye length seen from above; rather shallowly emarginate behind; strongly longitudinally impressed beside scapes; on vertical region and orbits finely or very finely punctate, grading to moderately or rather finely so on genae and epistoma; with upper face densely punctate. Clypeus very strongly transverse; finely to moderately and somewhat sparsely punctate; not deeply delimited basally; very weakly convex in basal half and somewhat impressed in apical half; very broadly rounded at apex. Malar space short but not very short, about equal to greatest width of pedicellus in side view in female, rather less in male. Where met by genal costa, the hypostomal costa is raised into a sharp or rather sharp tooth. Genal costa inflected: gena neither at all angulate nor much excavate behind lower mandibular base.

Antennae short, usually not much attenuate to apex; with scape short, weakly excised; with flagellum 24 to 30, usually 26- to 28-segmented.

Pronotum with dorsal transverse furrow rather strongly impressed and often transcostate at sides; with epomiae short; laterally finely to moderately and rather closely punctate above, more or less longitudinally rugose below. Propleura finely punctate and shining. Mesoscutum moderately or rather strongly convex; with notaulices short and weakly impressed; moderately punctate discally, finely to very finely so laterally and anteriorly. Scutellum finely to moderately punctate in front, finely so behind; in larger specimens almost flat above, often margined to beyond middle, falling almost perpendicularly behind; in smaller specimens more ordinarily shaped, but the same conformation suggested. Mesopleura closely and rather coarsely

punctate, moderately so above and behind, often alutaceous in male, rugose by anterior margin and below wing-base: sternaules broad, rather shallowly impressed: mesosternum very finely punctate: epicnemial carina extending about half-way up mesopleuron, strongly raised between sternaules: prepectus moderately and closely punctate at sides, bearing traces of a pair of keels forming lateral margins to the strongly excavate coxal cavities: mesolcus strong and deeply impressed, closed behind. Propodeum rather short, sharply raised from behind; on area externa finely or rather finely punctate and on area pleuralis rather finely to moderately so, otherwise finely rugulose and rather shining, though occasionally rugose; with costae rather weak, the costulae very weak and usually incomplete, sometimes absent or scarcely indicated: area posteromedia not extending to middle: area superomedia rather elongate, generally strongly contracted from junction with costulae to base, seldom basally delimited.

Gaster of female spindle-shaped, of male more parallel-sided. Petiolar segment appearing rather short, of female 1.4 to 1.8 times, of male 1.5 to 2.2 times length of its greatest breadth; with distinct basal lobes, but with lateral margins not prominent; with dorsal keels weak, but often distinct for about three-quarters length of segment; finely or, more often, moderately punctate, usually in part rugose-punctate, very finely punctate behind. Tergite 2 with thyridia usually short, and in female inconspicuous: remainder of gaster more and more finely punctate. Female third valvulae projecting, with ventral margin decurved.

Fore wings with stigma broad; with basal and disco-cubital veins parallel or slightly convergent; with areolet petiolate to sub-sessile; with nervus parallelus emitted a little below middle of brachial cell. Hind wings with nervellus antefurcal, intercepted below middle.

Legs rather stout. Tarsal claws weakly pectinate, bearing a few weak comb-teeth near base.

Length 5 to 8½ mm.

Head black; with mandibles, except at apex and sometimes at base, and palpi flavous to ochreous; with clypeus usually castaneous at apex. Antennae with scape and pedicellus black or almost so, paler at apical margins; with annellus castaneous or paler; with remainder of flagellum fulvous to ochreous or darker below, darker, often mainly ferrugineous, above. Thorax black, with hind margin of mesopleura paler: tegulae stramineous or more white, occasionally darker. Legs mainly dull flavous to fulvous, more the latter; with coxae and trochanters black or almost so, pale at apex; with trochanterelli largely darkened; with fore and mid femora darkened near base and more extensively below, and hind femora black or almost so except at apex and extreme base; with hind tibiae more ferrugineous, especially below, or in male even darker, but always pale at base; with tarsi more or less darkened, and fore and mid tibiae occasionally darkened near base. Wings with veins and stigma ferrugineous or paler, basally dull flavous. Petiolar segment black, rufous at extreme apex. Remainder of gaster may be entirely rufous, occasionally castaneous, but is generally modified in the following ways: first, it is often more flavous beneath, and sometimes has ill-defined flavous hind margins of tergites: secondly, it is usually to a greater or lesser extent overspread with infuscation. Most

frequently this is developed on tergite 2 as a median mark or as a pair of marks (the form described by Thomson as *binotatus*); but in darkest forms little remains pale in dorsal view but the thyridia and hind margins of tergites. Male gaster as thus described, but the darker forms relatively frequent.

Redescribed from the following material: ENGLAND, unlocalized, 1 ♂, 2 ♀♀, Desvignes coll. (♂ under *subnitidus* Grav., see Morley, 1911: 193); Devon, Dartmoor, Lustleigh, 1 ♀, 30.vi.1934, R. C. L. Perkins; Somerset, Bristol, Long Ashton, 1 ♂ em., 1.v.1935, ex *Cladius difformis* Panz. (Tenthredinidae), C. L. Walton (Kerrich, 1942: 63); Kent, Eynsford, 1 ♀, 6.vi.1939, G. E. J. Nixon; Wye, 1 ♂, 10-13.v.1949, Surrey, Byfleet, 1 ♂, 26-29.v.1949, Herts., Royston, 1 ♀, 24.v.1949, R. B. Benson; Cambridge, 1 ♂, v.1931, G. J. K., Gog-Magog Hills, 1 ♂, 19.v.1918, G. T. Lyle, Devils Dyke, 1 ♂, 5.vi.1925, H. T. Pagden; Yorks., Anstey, 1 ♂, 25.v.1930, J. W. Saunt, Grassington, 1 ♀, 19.v.1945, W. D. Hincks: BELGIUM, unlocalized, 6 ♂♂, 2 ♀♀, Diest, 1 ♂, 1 ♀, 1850, C. Wesmael; Arlon, 2 ♂♂, 20.v.1870, J. Tosquinet: SWEDEN, Skåne, Ringsjö, 2 ♂♂, 7.vi, 1 ♀, 12.vi, Höör district, 1 ♂, 13.vi, 1 ♀, 18.vi, Skärålid, 1 ♂, 3.vii.1938, D. M. S. & J. F. Perkins; Stockholm district, 2 ♂♂ (one the lectotype of *morio* Hlgr., the other labelled allotype), 1 ♀ (type of *insidiator* Hlgr.), C. Boheman; Lapland (southern), Tärna, 1 ♂, 18.vii, 1 ♀, 19.vii (paratypes of *morio* Hlgr.), C. Boheman: SWITZERLAND, Geneva, Peney, 3 ♂♂, 1886, 1 ♂, 9 ♀♀, 18.v.-13.vi, 1876-1889, Tour-nier; Valais, Ferpècle, 1 ♂, 21-27.vi, Arolla, 1 ♀, 30.vi, 1 ♀, 6.vii.1935, R. B. & J. E. Benson: GERMANY, unlocalized, 1 ♀, Ruthe coll.; unlocalized (probably Germany) 1 ♂, 1 ♀, O. Schmiedeknecht; Schladen, 1 ♀, 10.v.1946, Celle, 1 ♂, vi.1942, R. Hinz: CZECHOSLOVAKIA, Karov, 1 ♀, 9.vi.1907, coll. Holik; Trojacka, 1 ♂, 6.vi.1934, Brno, 1 ♀, 18.v.1937, Fr. Gregor.

Further material examined: ENGLAND, Surrey, Clandon Downs, 10 ♂♂, 8 ♀♀, 5-7.vi.1950, J. F. Perkins: HOLLAND, Tilburg, 1 ♂, 4.vi.1942, A. Adriaanse (coll. H. G. M. Teunissen under *parvulus* Thoms.): SWEDEN, material in Thomson collection (see above): FINLAND, Tvärminne, 1 ♂, L. v. Essen; Impilaks, 1 ♂, R. Forsius; Helsingfors, 1 ♂, W. Hellén: FRANCE, Maisons Laffitte, St. Cloud, la Bourboule, J. de Gaulle; Haut-Rhin, A. Seyrig (numerous specimens in mus. Paris): GERMANY, Holstein, Trittau, 1 ♂, v.1946, Bayrische Wald, Waldmünchen, 1 ♂, vi.1948, G. Heinrich: AUSTRIA, Styria, Admont district 1,200 m., 3 ♀♀, 11.vi-1.vii.1950, G. Heinrich.

Biology. Reared from *Cladius difformis* Panz. (Tenthredinidae) on strawberry (Kerrich, 1942: 63).

Anisoctenion pumilio Holmgren

1858 *Exenterus pumilio* Holmgren, *Svensk Vet.-Akad. Handl.* 1: 240.

1888 *Cteniscus* (or *Delotomus*) *pumilio* Thomson, *Opuscula Entomologica*, fasc. 12: 1255.

1912 *Cteniscus pumilio* Schmiedeknecht, *Opuscula Ichneumonologica*, 5: 2339-2340.

1929 *Acrotomus moravicus* Gregor, *Zprávy čsk. Stát. Reál. Gymn. Nové Jičín*, 1929: 4 (separate pagination), *nomen nudum*, **syn. n.**

1941 *Acrotomus parvulus* Hellén, *Notul. Ent.* 20: 48 (non Thomson, 1883).

Head (Fig. 18) strongly transverse; strongly narrowed behind eyes and rounded; shallowly emarginate behind: on vertical region and temples extremely finely punctate, usually near occiput and on genae clearly less finely so: with lower face finely,

and upper face finely and closely punctate. Clypeus not strongly transverse; sparsely beset with punctures, rather fine to moderate; rather deeply delimited basally; distinctly projecting in side view, but weakly convex; apically broadly rounded, almost truncate; distinctly transversely impressed before margin. Cheeks short and not at all buccate, but in frontal view slightly concave. Malar space about two-thirds distance between mandibular apices. Hypostomal costa moderately raised to a very obtuse point, where it slopes strongly outward: genal costa distinctly raised, inflected. Mandible (Fig. 2).

Antennae filiform; with scape rather elongate, moderately excised extero-ventrally; with pedicellus abnormally elongate (Fig. 28); with flagellum 22- to 25-segmented.

Pronotum with dorsal transverse furrow narrow and irregular, but behind it in middle strongly shining; with epomiae of moderate strength, not curtailed below; behind epomiae extremely finely punctate above, rugulose or rugose below. Propleura very finely punctate, rugose anteriorly and by inner margin. Mesoscutum very strongly convex, rising sharply from pronotum, though almost flat discally; with notaulices moderately and rather sharply impressed; very finely punctate, closely so anteriorly. Scutellum rather weakly to strongly convex, often buckled; not margined to middle; falling rather sharply behind; extremely finely punctate, sparsely so discally. Mesopleura rather finely to finely punctate below, extremely finely so above, and with an extensive speculum: sternaules broad and deeply impressed: mesosternum finely and not closely punctate, its halves notably convex: mesolcus of moderate width, deeply impressed, partly closed by a bituberculate ridge behind: prepectus rugose-punctate: epicnemial carina slightly elevated, sometimes almost complete. Propodeum short, curving strongly downward from base, and descending sharply from costulae; with costae of moderate strength; very finely, and for the most part closely punctate, only on and around area posteromedia conspicuously shining, sometimes rugulose behind spiracle: area superomedia distinctly longer than broad, nearly parallel-sided or a little expanded to costulae, not basally delimited: area posteromedia not extending to middle.

Petiolar segment 1.6 to 2.0 times length of its greatest breadth; almost regularly explanate from near base to very near apex in female; laterally distinctly but not strongly margined; with dorsal keels not strong, but distinct to rather near apex; finely or very finely punctate and finely rugulose beside keels, smoother between them, and with a median longitudinal depression between them on post-petiole. Remainder of gaster extremely finely punctate. Tergite 2 with thyridia conspicuous, short and broad. Female third valvulae in side view narrow, projecting strongly beyond apex of tergite 8, with ventral margin straight or almost so (Fig. 20).

Fore wings with basal and disco-cubital veins slightly divergent; with radius distinctly upcurved apically; with areolet sessile or sub-sessile; with nervus parallelus emitted below middle of brachial cell. Hind wings with nervellus slightly antefurcal, intercepted far below middle.

Tarsal claws not, or weakly and irregularly pectinate.

Length 5 to 6½ mm.

Head black, with mandibles, except near apex, and palpi stramineous: gena with

a pale mark, stramineous or darker, at apical margin by lower articulation of mandible: clypeus with a broad, rather triangular mark, castaneous or paler, by the almost truncate middle part of the apical margin. Antennae with flagellum ochreous to rufo-ferrugineous, darker above than below: scape and pedicellus generally notably darker, but with their apical margins pale, as also annellus and extreme base of postannellus. Thorax and propodeum black, with the following parts paler: scutellum and metascutellum at apex and along hind margins, fore and hind margins of mesopleura, marks below tegulae, and hindmost angles of propleura: humeral angles of pronotum and tegulae stramineous: ventral margin (collar) of pronotum, more broadly in middle and at lower angles, distinctly or obscurely stramineous. Legs mainly fulvo-testaceous, with tarsi and hind tibiae darkened at apex, and hind knees sometimes darkened: hind tibiae otherwise paler: trochanters and trochanterelli, hind coxae at apex, and mid and fore coxae more extensively, stramineous. Wings with veins and stigma ochreous to ferrugineous, basally stramineous. Gaster with tergite 1 black, with tergites 2 and 3 sometimes almost black in basal half, and with remainder gradually paler towards apex, which is often almost ochreous; with apical margins of all tergites of female and some of male, and with thyridia, yellowish; with venter stramineous or darker.

Redescribed from the following material: ENGLAND, NE. Yorks., Mulgrave Woods, 1 ♀, 3.v.1936, H. Britten; Westmorland, Witherslack, 1 ♂, 24.vi.1941, A. E. Wright: GERMANY, Bavaria, Görkau, 1 ♀, vi.1930, Th. Kupka; Silesia, Schillersdorf, 1 ♀, i.ix.1935, 1 ♀, 4.ix.1937, Th. Kupka; unlocalized (probably Germany), 1 ♀, O. Schmiedeknecht: CZECHOSLOVAKIA, Moravia (unlocalized), 1 ♀; Moravia, Suchdol, 1 ♂, 27.viii. 1930, Fr. Gregor; Bohumin, Haatsch, 1 ♂, 28.viii. 1936, Th. Kupka: SWEDEN, Skåne, Höör district, 1 ♂, 11.vi, Ringsjö, 1 ♂, 19.vi.1938, D. M. S. & J. F. Perkins: FINLAND, Tavastia australis, Sääksmäki, 1 ♀, mid-vi.1921, W. Hellén (Hellén, 1941, under *A. parvulus* Thoms.); Hattula, 1 ♀, L. v. Essen.

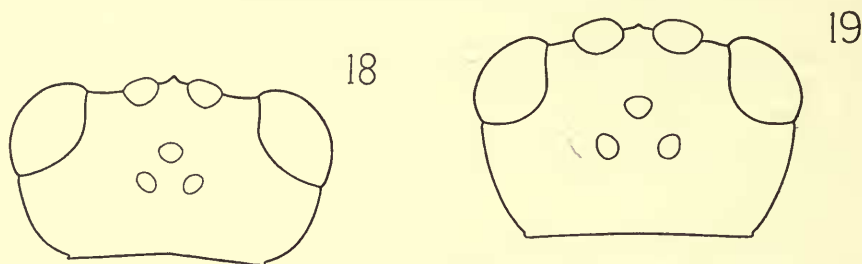
Additional material seen: SWEDEN, Stockholm, type ♀; Skåne, 1 ♂, C. Boheman; Skåne, Farhult, 1 ♀ in Thomson coll. (Thomson, 1888: 1255) redetermined by G. J. K.: FRANCE, Mesnil, nr. Paris, 1 ♀, 19.vii.1891, J. de Gaulle: GERMANY, Hannover, 1 ♂, 21.viii. 1946, R. Hinz: AUSTRIA, Carinthia, 1 specimen, C. Boheman.

I examined the Holmgren type in 1939, and formed the opinion that the species should be transferred to *Anisoctenion*. Six days later, the Moravian pair was received in Manchester from Professor Gregor: they agreed with the diagnosis made and with my memory of the Holmgren type. The synonymy was confirmed by direct comparison in 1947.

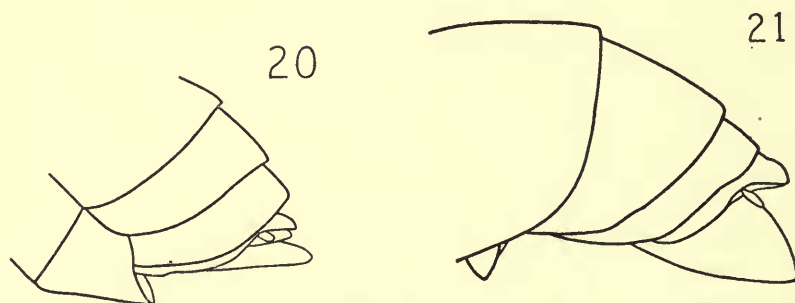
Professor Gregor wrote to me that he had taken the species commonly in warm localities. He found there were great individual differences between different specimens and that, in smaller specimens, there was very little difference in length between the mandibular teeth. He regarded the species as a connecting link between *Acrotomus* and *Cteniscus*, but had not published a valid description lest one should already exist in an unsuspected place as, in fact, has proved to be the case.

In Schmiedeknecht's key to *Acrotomus* (5: 2284-2286) this species runs down with *alacer* Grav.; indeed, the Schmiedeknecht specimen in the British Museum collection was so determined by that author. *Pumilio* differs from *alacer* principally in having

the head short, strongly narrowed behind the eyes; malar space much shorter than distance between mandibular apices; mesopleura finely punctate; sternalices and mesolcus strongly impressed; gaster spindle-shaped in female; ovipositor sheaths strongly projecting (Fig. 20); tarsal claws scarcely pectinate; in having none of the features mentioned (p. 350) as special for *alacer*; and, of course, in the coloration and much smaller size and number of antennal segments. It has a much greater



FIGS. 18-19. Head in dorsal view of Fig. 18. *Anisoctenion pumilio* Hlgr. Fig. 19. *Anisoctenion alacer* Grav.



FIGS. 20-21. Apex of gaster, in sinistro-lateral view, of Fig. 20. *Anisoctenion pumilio* Hlgr. Fig. 21. *Anisoctenion laticeps* Grav.

resemblance to a small specimen of *rubiginosus* Grav. which, however, has the head slightly broadened behind the eyes and the mesopleura rather coarsely punctate; and from which it can also be separated by the key characters.

***Anisoctenion tenuis* sp. n.**

Head not so transverse as in *pumilio* Hlgr., but strongly narrowed and rounded behind eyes; moderately emarginate behind: on vertical region and temples finely and rather sparsely punctate; on genae finely or very finely and very sparsely punctate above, rather finely and much more closely so below; on upper and lower face moderately and closely punctate, more finely and sparsely so towards orbits. Clypeus as described for *pumilio* Hlgr., but less sparsely punctate and not sharply or at all deeply delimited. Cheeks and malar space as described for *pumilio* Hlgr.: hypostomal and genal costae also similar, but hypostomal weakly raised.

Antennae with scape stout, rather weakly but sharply excised externally (Fig. 29);

with pedicellus of normal proportions; with flagellum filiform and slender, 27- to 30-segmented.

Pronotum with dorsal transverse impression broad; with epomiae of moderate strength; laterally sparsely and very finely punctate above, finely reticulate to rugose below. Propleura shallowly punctate; finely and rather closely so by outer margin, elsewhere more coarsely and sparsely so. Mesoscutum not rising sharply from pronotum, but rather strongly and evenly convex, though flattened discally behind middle; with notaulices moderately and rather sharply impressed anteriorly, quite distinct to flattened part; finely and more or less sparsely punctate. Scutellum weakly convex and not falling sharply behind; sharply margined to beyond middle; finely and sparsely punctate discally, very finely and more closely so at sides and especially behind. Mesopleura rather finely to moderately, rather shallowly and sparsely punctate below, obscurely punctate anteriorly above: sternalices broad and rather deeply impressed: mesosternum finely and not closely punctate: mesolcus of moderate width and moderately impressed, closed behind: prepectus finely rugose: epicnemial carina sharply though not strongly raised. Propodeum long and not at all sharply declived; with costae of moderate strength in front, stronger behind; for the most part very finely to finely punctate and elongately griseo-pilose: area postero-media strongly transverse, extending barely a third the way forward; area supero-media narrow, very much longer than its greatest breadth, basally delimited but not sharply so, expanded to where it emits costulae before middle.

Petiolear segment very elongate and slender, 3.5 to 3.8 times length of its greatest breadth; laterally distinctly but not strongly margined, with spiracular tubercles prominent; with dorsal keels not strong, not reaching base and evanescent well before apex; finely and sparsely punctate beside keels behind spiracles; with sparse, elongate pilosity. Tergite 2 with thyridia distinctly broader than long; finely punctate in basal half: gaster more and more finely and sparsely punctate towards apex.

Fore wings with basal and disco-cubital veins nearly parallel; with areolet subsessile or sessile; with nervus parallelus emitted above middle of brachial cell. Hind wings with nervellus almost opposite, intercepted about in middle.

Tarsal claws very weakly pectinate.

Length 6 to 7 mm.

Head black, with mouth-parts except mandibular apices, and clypeus except marginally, pale flavous: clypeus deeper flavous in Burmese type. Antennae mostly flavous to base of post-annellus; beyond that dull fulvous to pale ferrugineous, distinctly darker towards apex. Thorax and propodeum rufo-ferrugineous to black; with ventral margin of pronotum, propleura, fore and hind margins of mesopleura, and hind margins of scutellum and metascutellum distinctly paler; with scutellum above and propodeum behind dull rufous in Burmese type. Legs mainly fulvous; with fore and mid coxae, trochanters and trochanterelli whitish, the coxae fulvous around base; with hind legs slightly darkened in part in Formosan specimen. Wings with veins and stigma ferrugineous; with stigma slightly and veins conspicuously paler at base. Gaster with tergite 1 rather ferrugineous except at mid apex, and with thyridia pale: remainder rufous in Burmese type but in Formosan specimen mainly infusate, though with tergites dark rufous apically.

Described from the following material: NE. BURMA, Kambaiti, 7,000 ft., 1 ♂, 24.v.1934, R. Malaise (holotype): FORMOSA, Hassenzan, 1 ♂, 24.vi. 1934, L. Gressitt (paratype).

Holotype in Royal Natural History Museum, Stockholm: paratype in collection of Dr. H. K. Townes.

This species is clearly most closely related to the European *pumilio* Hlgr. The advance in knowledge of the taxonomy and distribution of the genus gained by describing the species is held to outweigh the disadvantage of having to do this from the male sex alone.

W. R. M. Mason has sent me a single female specimen of a species related to *pumilio* Hlgr. and *tenuis* sp. n., from a locality at a height of 3,500 ft. in the Nilgiri Hills in southern India. This is a further wide extension of the known distribution of the genus.

Anisoctenion ridibundus Gravenhorst

1829 *Tryphon ridibundus* Gravenhorst, *Ichneumonologia Europaea*, 2: 188-189.

1906 *Acrotomus ridibundus* Pankuch, *Z. Hym. Dipt.* 6: 219.

1911 *Acrotomus sexcinctus* Morley, *The Ichneumons of Great Britain*, 4: 197 (non Gravenhorst, 1829).

Head moderately narrowed behind eyes in female, more strongly so in male, and strongly rounded; rather shallowly emarginate behind: for the most part finely punctate, rather closely so above, sparsely so on most of gena; with lower and upper face moderately punctate, and generally with lower margin of gena densely and a little more coarsely so. Clypeus sparsely beset with punctures of mixed sizes, very fine to rather coarse; elongately pilose near apical margin; sharply delimited basally; strongly projecting in side view, but not strongly convex; not broadly rounded apically in female, though often rather so in male; and not or scarcely impressed before margin. Cheeks not at all buccate, but in frontal view slightly concave. Malar space of female about three-quarters distance between mandibular apices; that of male short, about equal to greatest width of fore metatarsus, seen from above near apex. Hypostomal costa rather weakly raised: genal costa scarcely raised, inflected.

Antennae relatively slender; with scape strongly convex interno-dorsally and weakly excised externo-ventrally; with pedicellus almost barrel-shaped, but more elongate than in *laticeps* Grav. (Fig. 30); with flagellum 26- to 29-, most usually 28-segmented; having the ultimate segment usually elongate, but sometimes imperfectly and sometimes fully divided (thus sometimes having a segment more in one antenna than in the other); and having some middle segments incurved externally as in *laticeps* Grav.

Pronotum with dorsal transverse furrow shining; with epomiae sharp but not strong; behind epomiae finely punctate above, rather strongly longitudinally rugose below. Propleura irregularly, rather finely and sparsely punctate. Mesoscutum strongly convex, rising rather sharply from pronotum; with notaulices weakly or moderately, seldom at all sharply impressed; finely punctate discally, less finely so peripherally. Scutellum strongly convex, and falling rather sharply behind; not margined to middle; finely to very finely punctate. Mesopleura moderately and not

closely punctate below, finely, sparsely and irregularly so above: sternaules broad, rather shallowly impressed: mesosternum finely to moderately and closely punctate, prepectus rather coarsely so: mesolcus sharply impressed, widening a little posteriorly, almost always well closed behind: epicnemial carina very slightly elevated, extending about half way up mesopleuron. Propodeum finely punctate above and on area pleuralis, elsewhere weakly rugose; with costae of moderate strength at sides and behind, usually weak and often incomplete above: area basalis excavate: area supero-media longer than broad.

Petiolar segment 1.6 to 2.0 times length of its greatest breadth; finely punctate above, but almost impunctate by hind margin; sharply but not strongly margined laterally; with dorsal keels not strong, but distinct to well beyond spiracles; not canaliculate between dorsal keels where these are distinct, but with a median depression behind. Remainder of gaster finely to very finely punctate. Tergite 2 strongly transverse; with a pair of broad, not sharply defined, furrows extending diagonally outward from base; with thyridia short, sharply impressed and conspicuous, about one-half breadth of intervening space. Female hypopygium sharply folded mid-ventrally. Female third valvulae rather broad, closely punctate; with ventral margin slightly sinuate but, on the whole, slightly upcurved; projecting well beyond apex of tergite 8.

Fore wings with basal and disco-cubital veins parallel or nearly so; with radius slightly upcurved at apex and slightly sinuate; with areolet sub-sessile; with second recurrent almost regularly arcuate; with nervus parallelus emitted a little below middle of brachial cell. Hind wings with nervellus slightly antefurcal, intercepted below middle.

Legs rather stout. Hind tibiae distinctly swollen before and very distinctly narrowed to base. Claws of all tarsi strongly or rather strongly pectinate.

Length $6\frac{1}{2}$ to 9 mm.

Female. Head black, with the following parts flavous, with some fulvous margins: palpi, mandibles except at apex, clypeus, genae except broadly near occiput, and whole of lower face, except for a short median mark just below antennae. Antennae with scape and pedicellus dull flavous to rufous below, rufous to ferrugineous above; with annellus more or less rufous; with remainder of flagellum fulvous to testaceous, more or less ferrugineous near base. Thorax and propodeum black, with the following parts flavous, with some fulvous margins: scutellum at apex and metascutellum, humeral angles of pronotum and ventral margin rather broadly at sides, propleura mainly, marks below fore wings, tegulae, and metategulae in part; usually with the following parts more or less ferrugineous: fore and hind margins of mesopleura in part, lateral extensions of scutellum and metascutellum, and some margins of propleura; sometimes with paler marks beside mesolcus. Legs mainly fulvous, with hind tibiae decidedly paler at base; with fore and mid coxae, and all trochanters and trochanterelli, mainly stramineous to pale flavous, the mid coxae often flushed with fulvous; with hind coxae except at apex, and hind femora except narrowly at base and apex, dark ferrugineous. Wings with veins and stigma ferrugineous, paler at base. Petiolar segment black, sometimes dark ferrugineous towards apex. Remainder of gaster mainly dark ferrugineous above; with apex and sides and with thyridia fulvous; with

slightly broad apical margins of tergites 2 and 3, usually with narrow margins of remaining tergites, and with most of venter paler.

The male differs as follows: genae with flavous coloration much more restricted, often only narrowly flavous by the mandibular articulation; clypeus with a pair of dark marks below tentorial pits; lower face with a broad, percurrent, median black band and with eye margins black for some distance below antennal sockets, the black margin sometimes curved inward towards tentorial pits. Propleura not pale-coloured except by hind margins. Hind tarsi and tibiae dark above, the latter conspicuously pale at base: fore and mid femora and tibiae often paler than in female. Gaster of darker appearance, scarcely fulvous at apex and only narrowly so at sides.

Redescribed from the following material: ENGLAND, Desvignes coll., 1 ♀ (previously twice misdetermined); Surrey, Abinger, 1 ♀, 18.viii.1947, G. J. K.: BELGIUM, unlocalized, Groenendael, Rouge Cloitre, 9 ♂♂, 7 ♀♀, Wesmael and Tosquinet coll.: SWITZERLAND, Grisons, Tarasp, 1 ♀, Ch. Ferrière: GERMANY, unlocalized (probably Germany) 1 ♂, O. Schmiedeknecht; nr. Berlin, 1 ♀, Ruthe coll.; Munich and other localities, 1 ♂, 20.vi, 1 ♂, 2 ♀♀, 16.vii. Buchecker coll.; Bavaria, Oberstdorf, Birgsau, 3 ♀♀, viii.1936, G. E. J. Nixon; Silesia, Ransern, 1 ♂, 1 ♀, 7.vi.1934, K. Hedwig: CZECHOSLOVAKIA, Bohemia, 1 ♂, J. Sekera; Breudeis, 1 ♂, coll. Salvator; Trojacka, 1 ♂, 6.vii.1928, Fr. Gregor.

The Silesian pair, kindly given me by Rektor K. Hedwig, was compared with the male type in Breslau in September 1936.

From the key to species and description given by Morley (1911) under *Acrotomus sexcinctus* Grav. I could tell that he had an *Anisoctenion*. In response to my request for the loan of one of the specimens taken by Capron, most probably around Shere in southern Surrey, Mr. Morley most generously gave me a male. This proved, as I had suspected, to be of this species, which has not before been properly recorded as British.

Further material seen: FRANCE, 5 specimens, Sèvres, St. Cloud, &c., 12.vi.-28.vii, J. de Gaulle: GERMANY, Göttingen, 1 ♂, 1 ♀, 14-19.vii, 1 ♀, 28.viii.1946, R. Hinz: AUSTRIA, Carinthia, 1 ♀, C. Boheman. See also supplement, p. 452 below.

***Anisoctenion pronotalis* sp. n.**

Head distinctly broader than thorax, strongly transverse; slightly and almost rectilinearly narrowed behind eyes, then strongly rounded; moderately emarginate behind; in facial view strongly narrowed to mouth, with epistoma not strongly convex and with cheeks not at all buccate: with temples and cheeks rather finely punctate; with lower face rather coarsely, but at sides and near midline not densely so; with upper face broadly at sides moderately punctate: vertical region very finely punctate and upper face in middle almost impunctate. Clypeus not strongly transverse; sparsely beset with moderate punctures; basally distinctly but not deeply delimited; apically moderately rounded; in side view very weakly convex in basal, and almost flat in apical half. Malar space a little less than distance between mandibular apices. Hypostomal and genal costae sharply but not strongly raised, meeting not far behind mandibular base, at a distance of about twice their greatest height.

Antennae (Fig. 32) with scape rather elongate, not quite twice the length of its

greatest breadth, moderately excised externo-ventrally; with postannellus unusually elongate, just twice the length of the following segment, both measured along inner margin; with flagellum 33- to 34-segmented, elongate, slender, and finely tapering.

Pronotum strongly raised before the sharply impressed dorsal transverse furrow; with epomiae strong but short; laterally very finely punctate above, very strongly shining below; with lateral margins at about level of epomiae suddenly expanded to produce broad flanges, which present a distinct ventral surface overhanging the propleura. Propleura shining and finely punctate. Mesoscutum normally convex, rather dull; with notaulices weakly impressed but traceable to disk; rather finely punctate, between tegulae and notaulices more coarsely and closely so. Scutellum rather flattened; with margins not at all sharp, yet percurrent, separating a hinder face from the sides, and weakly tuberculate at junction; moderately punctate above at base, impunctate on disk, very finely punctate on sides and behind. Mesopleura moderately punctate except on and before speculum: sternaules rather strongly impressed: mesosternum almost flat, shallowly, but for the most part coarsely and very closely punctate: mesolcus narrow for more than half its length, then broadened and deepened, largely closed by an incised costa behind: prepectus with a pair of sharp keels which form lateral margins to the coxal cavities, and a pair of blunter outwardly directed keels. Propodeum with a conspicuous covering of elongate, silvery hairs; rather shining and, for the most part, very finely rugulose-punctate, but with the area pleuralis finely to moderately and closely punctate; with costae of moderate strength: area basalis not distinctly delimited apically: area superomedia elongate, greatly expanded to the costulae, which are emitted far before middle, decidedly narrow behind: area posteromedia not extending to middle.

Petiolear segment elongate, about 2.8 times length of its greatest breadth; not laterally margined through the spiracles, which are more or less prominent; with sharp basal auricles; rather strongly convex, but with dorsal keels scarcely indicated; smooth near mid line, moderately punctate at sides. Tergite 2 about as long as its apical breadth; with a pair of strong, though not sharply defined, diagonal impressed furrows at base; with thyridia large and conspicuous. Segment 3 of female with distinct epipleura margined to near apex. Female hypopygium sharply folded mid-ventrally. Female third valvulae rather broad, with ventral margin slightly up-curved: projecting strongly beyond apex of tergite 8.

Fore wings with stigma rather elongate and narrow; with basal and disco-cubital veins convergent; with radius upcurved at apex; with areolet sub-sessile; with second recurrent strongly sinuate; with nervus parallelus emitted about in middle of brachial cell. Hind wings with nervellus slightly antefurcal, and intercepted a little below middle.

Claws of all tarsi strongly pectinate from base to apex.

Length of female about $12\frac{1}{2}$ mm., of male $11\frac{1}{2}$ mm.

Head bluish-black, with the following parts bright flavous, narrowly margined with fulvous: mouth-parts except mentum and mandibular apices, clypeus, genae except near occiput, and lower face. Antennae with scape dull rufous above, with an infuscation near apex and extending along outer edge, flavous beneath; with pedicellus and annellus partly pale rufous, partly infusate, paler beneath; with remainder

of flagellum ferrugineous, paler beneath, towards apex, and at apices of basal segments and base of postannellus; with postannellus otherwise almost black above. Thorax and propodeum black, but with mesoscutum bluish-black like the head, and propleura inclining to ferrugineous; with flavous marks below fore wings: tegulae dull castaneous, in part dull flavous. Fore and mid legs with coxae and trochanters stramineous, the mid coxae to some extent infusate behind; with femora more or less rufous, paler in front; with tibiae and tarsi pale rufo-testaceous: hind legs with coxae and trochanters castaneous, the trochanters and the coxae at extreme base dull stramineous beneath, the coxae also with paler marks above and below near base; with tarsi and apical fourth of tibiae rufous below, darker above, the tibiae in basal three-fourths pale beneath. Wings with veins and stigma ferrugineous, pale at base.

Gaster rufous; with tergite 1, except at apex, almost black; with tergite 2 dark at base except on thyridia.

The male differs in having the hind trochanters entirely, and trochanterelli in part, dull stramineous.

Described from the following material: NE. BURMA, Kambaiti, 6,000 ft., 1 ♀ (paratype), 1.vi.1934, R. Malaise; Kambaiti, 7,000 ft., 1 ♀ (holotype), 1 ♂ (allotype), 8.vi.1934, R. Malaise.

Holotype and allotype in Royal Natural History Museum, Stockholm: paratype in British Museum (Natural History).

The strongly pectinate claws and form of the female third valvulae place this species in the *laticeps* species-group. The elongate scape, strongly sinuate second recurrent vein, and general coloration relate it to *laticeps* Grav.; but it resembles *ridibundus* Grav. in having diagonal furrows on the second tergite and a sharply folded hypopygium. The flattened scutellum is reminiscent of *laetus* Grav., and the elongate petiolar segment also of *triangulatorius* Grav. The form of the prepectus is suggested in *rubiginosus* Grav., but that of the pronotum is quite novel among palaearctic Cteniscini.

From Dr. H. K. Townes, through Mr. W. R. M. Mason, I have received a specimen with the following data: FORMOSA, Musha, 1 ♀, 21.v.1932, L. Gressitt. This differs from the above-described northern Burmese specimens as follows: hypostomal costa weaker, and genal costa almost absent, though a vestige is just discernible on left side of head. Flagellum 32-segmented. Pronotum laterally moderately punctate above and with epomiae not short. Scutellum of essentially similar form, but almost conical and sharply bituberculate, moderately rugose-punctate at sides, and with discal impunctate area greatly reduced. Punctuation of area pleuralis and petiolar segment obscure. Diagonal impressed furrows of tergite 2 not discernible. Female third valvulae not so broad. Basal and disco-cubital veins very little convergent: areolet sub-petiolate. Length 10 mm. Head and thorax above a deeper black: pale colour of head a deeper, mustard-yellow: antennae almost unrelieved dull ferrugineous, apart from the castaneous annellus and extreme base of postannellus: tegulae darker: legs rather darker, in particular the mid coxae in greater part infusate: tergites 2 more extensively and 3 at base weakly infusate.

This form is so essentially similar to the northern Burmese specimens that I cannot regard it as specifically distinct. The differences in size and colour are less than are

known to occur in other species within Europe, and the smaller number of flagellar segments and narrower third valvulae are clearly correlated with the smaller size. The form of the scutellum and obsolescence of the genal costa I regard as minor malformations: since I have seen specimens of *Smicroplectrus jucundus* Hlgr. with the genal costa incompletely developed, I can regard this as not indicating a specific separation. Moreover, Townes & Townes (1949: 408) record that, in *Monoblastus kaniacensis* Hall, the genal costa is usually obsolete but sometimes complete. These and other differences will indicate the range of variation to be sought, just as the record itself is a valuable indication of the distribution.

Anisoctenion laticeps Gravenhorst

1829 *Tryphon laticeps* Gravenhorst, *Ichneumonologia Europaea*, 2: 214-215.

1883 *Delotomus laticeps* Thomson, *Opuscula Entomologica*, fasc. 9: 884.

1906 *Acrotomus laticeps* Pfankuch, *Z. Hym. Dipt.* 6: 289.

The two specimens standing under this name in the Gravenhorst collection are not in very good condition. They are not *laticeps* Thoms. *et auctt.*, but were seen in Stockholm in 1939 and determined by A. Roman as *Cteniscus dorsator* Thunb. var. *punctipleuris* Thoms. The first specimen is a male; the second has the gaster broken off. As Rektor K. Hedwig observed in a letter to me, these do not agree with Gravenhorst's description, and cannot be reckoned as types. Pfankuch (1906) stated all too briefly 'die Type ist ein Weibchen'. It is, of course, not impossible that he made a mistake; but *laticeps* Thoms. agrees well with Gravenhorst's description. Rektor Hedwig wrote to me that he could not find anywhere in the collection a specimen which could be the type, which must be reckoned as lost. The interpretation of Thomson, as first reviser, has, therefore, been accepted.

A redescription of the species having been made in 1938 from Thomson's series and other material, a lectotype was accordingly selected in 1939, a female specimen from Pålsjö. In 1948 it was found necessary to revise the description to conform with the standard adopted in the present paper; but the lectotype, and a specimen from Örtöfta designated allotype, are among the material from which the 1948 description has been made.

Head broadened behind eyes, generally very distinctly so; narrowly and rather strongly emarginate behind: on temples and cheeks moderately punctate, near occiput and malar space more densely so; with upper face very densely punctate; with lower face rather coarsely punctate, and on epistoma very densely so. Cheeks distinctly buccate. Clypeus strongly transverse; rather sparsely and rather coarsely to coarsely punctate; sharply delimited basally, with tentorial pits particularly conspicuous; apically broadly rounded (Fig. 8); moderately projecting in side view, and scarcely at all impressed before apical margin. Malar space about three-quarters distance between mandibular apices. Hypostomal costa weakly raised: genal costa scarcely raised, inflected.

Antennae (Fig. 33) with scape abnormally elongate, more than twice the length of its greatest breadth, moderately excised externo-ventrally; with pedicellus almost barrel-shaped; with post-annellus rather strongly curved externally and some middle

segments distinctly so; with flagellum 28- to 32-segmented, rather stout, explanate to about two-thirds its length and thereafter tapering to apex.

Pronotum with epomiae not strong; finely punctate before and rather finely to very finely punctate behind them; with longitudinal rugosities below rather weak to very weak or virtually absent. Propleura shallowly, but generally somewhat coarsely punctate, much more finely so near outer margin; strongly rugose anteriorly and by inner margin. Mesoscutum not rising sharply from pronotum, more or less weakly convex; with notaulices short, sometimes not reaching anterior margin; somewhat coarsely punctate discally, more finely so laterally and anteriorly. Scutellum moderately convex; margined to about middle; finely punctate discally and very finely so peripherally. Mesopleura shining, somewhat finely punctate above, rather coarsely but not closely so below: sternaules broad, moderately impressed: mesosternum finely and closely punctate, prepectus rather coarsely so: mesolcus strong and deeply impressed, partly closed behind: epicnemial carina very slightly elevated, extending about half-way up mesopleuron. Propodeum rather short; sharply raised from behind, and often also from in front, to base of area superomedia; with costae and especially costulae rather strong: rugulose-punctate above, mainly more shining on area superomedia and behind, but somewhat rugose before petiole; with area pleuralis mainly finely punctate: area superomedia hexagonal, not greatly longer than broad: area posteromedia extending to beyond middle.

Petiolar segment not notably elongate, normally 1.6 to 2.0 times length of its greatest breadth; obscurely rugose-punctate to near apex; laterally distinctly margined, with spiracular tubercles very prominent; with dorsal keels strong, though not nearly attaining apex, distinctly canaliculate between them. Tergite 2 with thyridia somewhat indistinct, especially in paler specimens. Remainder of gaster more and more finely punctate towards apex. Female third valvulae very broad, with ventral margin slightly sinuate and, on the whole, slightly upcurved; projecting well beyond apex of tergite 8 (Fig. 21).

Fore wings with basal and disco-cubital veins parallel or slightly convergent; with radius slightly upcurved at apex and often slightly sinuate; with areolet shortly petiolate; with second recurrent strongly sinuate; with nervus parallelus emitted about in middle of brachial cell. Hind wings with nervellus slightly antefurcal, intercepted in or slightly below middle.

Claws of all tarsi strongly pectinate.

Length 8 to 10 mm.

Head bluish-black, with the following parts deep flavous, margined with fulvous: mouth-parts except mandibular apices, clypeus, genae except near occiput, lower face except for an incomplete median darker line, margins a little way up and a median mark on upper face. Antennae deep flavous to pale ferrugineous, darker above except for annellus and base of postannellus. Thorax and propodeum bluish-black, with the following parts deep flavous margined with fulvous: wide anterior marginal mark and humeral angles of pronotum, propleura in part (though often not at all flavous in male), and conspicuous marks of scutellum and metascutellum: often there are pale marks beneath the wings, and ferrugineous hind margins of scutellum, metascutellum and mesopleura: tegulae flavous. Fore and mid legs mainly more or less fulvous; on

fore and sometimes mid legs the coxae, except at base, and the trochanters and trochanterelli, are decidedly paler; mid coxae darker at base: hind legs rufous; with coxae mainly, and trochanters, trochanterelli and femora above, pale ferrugineous to almost black. Wings with veins and stigma ferrugineous, much paler at base. Gaster black, typically with the following parts rufous: tergites 1 at extreme apex, 2 and 3 and most of 4, pygopods and most of sternal region: but the rufous coloration is occasionally less and sometimes more extensive.

Redescribed from the following material: ENGLAND, Cambs., Wicken Fen, 1 ♂, 31. vii. 1925, H. T. Pagden, 1 ♀, 26. viii. 1931, 1 ♀, 26. vii. 1933, G. J. K.; Norfolk, Catfield, 2 ♀♀, 12-16. vii. 1920, J. J. F. X. King: BELGIUM, unlocalized, 6 ♂♂, 4 ♀♀, Diest, 2 ♂♂, 2 ♀♀, viii. 1849, C. Wesmael: GERMANY, Silesia, Breslau, 1 ♀, 8. vii. 1937, 1 ♂, 19. vii. 1938, K. Hedwig; Ruthe coll., 1 ♂, 1 ♀, Buchecker coll., 1 ♂, 13. vii; unlocalized (probably Germany), 2 ♂♂, O. Schmiedeknecht: CZECHOSLOVAKIA, Bohumin, Haatsch, 1 ♀, 24. vii. 1938, Th. Kupka: SWEDEN, Skåne, Pålshö, 1 ♀ (lectotype), Örtöfta, 1 ♂ (allotype), C. G. Thomson.

Additional material seen: FRANCE, Arras, Chaville (near Paris), 6 specimens, 23. vi-ix, J. de Gaulle: GERMANY, Schladen, 1 ♂, 20. viii. 1945, R. Hinz; Bavaria, Haag-an-der-Amper, 1 ♀, 15. viii. 1947, 1 ♂, v. 1948, G. Heinrich: RUSSIA, Perm, 1 ♀, 25. vii. 1926, Lubischew (coll. A. Seyrig).

Time of appearance. On the data available I do not think that Heinrich (1949b: 121) was justified in postulating two generations, for I have June and a number of July dates for this species. It is, however, possible that there are two generations that nearly or quite overlap.

The elongate form of the antennal scape is very characteristic, and enables this species to be separated at once from species of *Cteniscus* of similar appearance, even when the mandibles cannot be seen.

Anisoctenion laetus Gravenhorst

1829 *Mesoleptus laetus* Gravenhorst, *Ichneumonologia Europaea*, 2: 50-51.

1906 *Acrotomus laetus* Pfankuch, *Z. Hym. Dipt.* 6: 23.

Three forms have been separated in the key to species, and further distinguished below. These are here treated as varieties of a single species *laetus* Grav.; though Thomson (1883) treated all three as separate species.

The species as a whole was described by Gravenhorst (1829) as *Mesoleptus laetus*. Pfankuch (1906) refers to a label of Förster's as *Delotomus*, and states that the description of *Acrotomus orbitatorius* Schiødte by Holmgren corresponds with the type.

The form that is here regarded as typical and described in full agrees fairly well with the description of *Tryphon cephalotes* Gravenhorst. It was thus identified by Thomson (1883: 885): the present redescription is partly based on a pair of specimens from Thomson's series, and also a female thus named in the Ruthe collection.

Pfankuch (p. 296), in placing *cephalotes* in synonymy with *laetus*, stated that the type was missing from the collection. He gave the sex as female, which it must have been, according to the genal coloration, if it really was the *Anisoctenion* species.

The first reviser of *cephalotes*, however, was Stephens (1835, 7: 250-251), who had

not an *Anisoctenion* but a species of *Cteniscus* (also mixed with *cephalotes* in the Ruthe collection). A single female specimen bears Stephens's original label: this was placed in the British Museum collection, perhaps by C. Morley, under *Cteniscus pictus* Grav., together with several other Stephens specimens which that author, who made no mention of *pictus*, may have placed as *cephalotes* (see Morley, 1911: 194).

I have worked through Gravenhorst's original description to see which of the two interpretations, that of Stephens or that of Thomson, can be better substantiated; but the result has been inconclusive. It seems preferable to disturb the present nomenclatorial usage as little as possible, pending a solution of the problems here considered; so the form of the species now described in full will be referred to as var. *cephalotes* Grav. Thoms.

Thomson did not recognize *laetus* Grav. The other two forms he described as new species, *marginatus* and *calcaratus*. Gravenhorst's description of *laetus* was evidently made from a series of males; and it represented the variation within the species as he saw it. The name *laetus* cannot, therefore, be used in a restricted sense for any one of the three varieties until the Gravenhorst series has been re-examined and a lecto-type recognized.

A full redescription has been made of the form *marginatus* Thoms., in order to compare it most carefully with *cephalotes* Grav. Thoms. One of the specimens thus studied was a female from Thomson's series, which was both previously and subsequently compared with the type pair from Isgärde on Öland. Schmiedeknecht added nothing to our knowledge of *marginatus*. Roman, in arranging the Swedish collection in the Stockholm museum, followed Thomson's nomenclature, but made *marginatus* a variety of *cephalotes*.

The male type of *calcaratus* has remained unique and unstudied since being described by Thomson (1883: 885).

Variety *cephalotes* Gravenhorst, Thomson

1829 ? *Tryphon cephalotes* Gravenhorst, *Ichneumonologia Europaea*, 2: 246-247.

1883 *Delotomus cephalotes* Thomson, *Opuscula Entomologica*, fasc. 9: 885 (non *Tryphon cephalotes* Stephens, 1835).

1906 *Acrotomus laetus* = *cephalotus* Pfankuch, *Z. Hym. Dipt.* 6: 296.

Head (Fig. 22) distinctly, generally strongly, broadened behind eyes; moderately emarginate behind: more or less finely and closely punctate, more closely so on medial parts of lower and upper face and on genae. Clypeus (Fig. 23) not strongly transverse; with moderate punctures, which are separated by about their own diameters above, but are a little coarser and considerably sparser below; sharply delimited basally; with apical margin not broadly rounded, but in middle almost truncate or slightly emarginate (not, however, with distinct apical angles as in *Acrotomus* s. str.); very weakly convex, weakly transversely impressed before apical margin. Malar space nearly half basal width of mandible, and a little shorter than distance between mandibular apices. Hypostomal costa rather strongly, but very obtusely and roundedly raised: genal costa distinctly raised, inflected.

Antennae with scape of normal proportions, moderately excised externo-ventrally:

flagellum 28- to 32-segmented, almost filiform, tapering slightly to apex; with post-annellus rather strongly curved externally.

Pronotum with dorsal transverse impression broad and shining; with epomiae strong; behind epomiae shining and moderately punctate above, strongly longitudinally rugose below (seldom very incompletely so). Propleura shining and rather finely punctate; rugose anteriorly and by inner margin. Mesoscutum strongly convex to middle, though not very sharply raised anteriorly; more or less finely and closely punctate; with notaulices short, distinct near but not reaching anterior margin. Scutellum of rather flattened appearance; with margins distinct to far beyond middle and almost appearing to extend round apex; very finely punctate, very sparsely so on disk, more densely near periphery. Mesopleura rather evenly and strongly punctate, mesosternum rather finely so: sternaulices broad but shallow: mesolcus not deep, narrow in anterior half then greatly broadening, partially closed by a deeply incised ridge behind: epicnemial carina distinctly elevated, dorsally incomplete. Propodeum above finely and somewhat densely punctate like the mesoscutum, on area pleuralis more strongly and densely so, elsewhere finely rugose; with costae including costulae of moderate strength: area basalis excavate, generally not fully delimited: area superomedia distinctly longer than broad: area petiolaris not extending to middle.

Gaster nearer spindle-shaped than clavate, but much more strongly narrowed to apex than to base: petiolar segment rather strongly and densely punctate except at apex; remainder of gaster much more finely so. Petiolar segment of female 1.7 to 2.3 times, of male 2.0 to 2.4 times as long as broad: laterally rather sharply margined, with spiracular tubercles not very prominent; with dorsal keels distinct to well beyond middle but not very strong; outside the keels rather strongly and densely punctate, but between them more sparsely and irregularly punctate to rugose-punctate, smooth behind. Tergite 2 with thyridia often well defined but seldom conspicuous, not broad. Female third valvulae projecting very little beyond apex of tergite 8; not broad, with ventral margin slightly sinuate or almost straight.

Fore wings with basal and disco-cubital veins slightly convergent; with second abscissa of radius very slightly sinuate or almost straight; with areolet more or less shortly petiolate; with nervus parallelus emitted about in middle of brachial cell. Hind wings with nervellus slightly antefurcal and intercepted below middle.

Tarsal claws strongly pectinate in female, rather strongly in male.

Length $7\frac{1}{2}$ to 10 mm.

Female. Head black, with the following parts stramineous to flavous, margined with ochraceous: genae largely, clypeus and lower face mainly. The pale coloration on the genae is confluent with that on the lower face, and extends about a quarter the way up the outer orbit, and also broadly to the lower articulation of the mandible: dark coloration extends along clypeo-frontal suture, and on lower face to a variable extent down mid line and from outer parts of antennal sockets, and up from the clypeo-frontal suture towards these marks. Mandibles stramineous to flavous, merging through ochraceous to the black tips. Antennae fulvo-testaceous, darker above and towards base; the scape and pedicellus generally black above. Thorax and propodeum black, with margins of some sclerites, and often with apical marks of scutellum and metascutellum castaneous; with tegulae more or less pale rufous; with humeral

angle and usually with lower margin of pronotum pale. Fore and mid legs rather pale rufous, becoming paler towards apex: hind legs darker rufous, merging to castaneous or almost black at base: fore coxae and trochanters largely flavous below; all trochanters paler at apex. Wings with veins and stigma ferrugineous, basally dull flavous. Petiolar segment black, rufous usually only at extreme apex. Remainder of gaster rufous, tending to paler below, somewhat infuscate near base.

Male. Head black, sometimes with a pair of pale marks on epistoma; with pale marks of inner orbits extending from about level of antennae, usually beyond lowest level of eye but never quite to mandibular base. Clypeus black at base and sides, with rufous or paler colour by apical margin, or more extensive. Lower margin of pronotum often not pale. Coloration otherwise as in female.

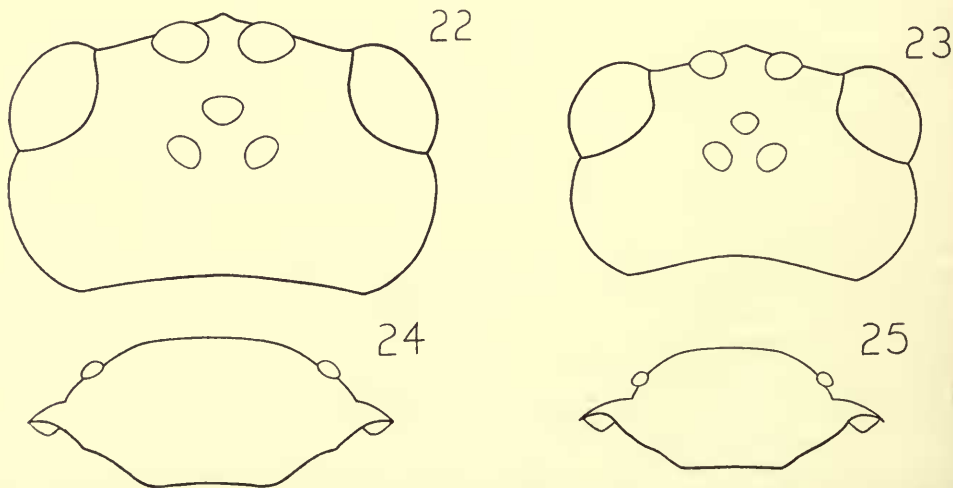
Redescribed from the following material: SWEDEN, mus. Stockholm, 5 ♀♀, 3 ♂♂, provinces of Småland, Östergötland, Bohuslän, Stockholm, Gästrikland, and Dalarne, det. Holmgren as *orbitorius* Schiødtte and det. Roman as *cephalotes* Grav.: GERMANY, 1 ♀, Ruthe coll.: SWITZERLAND, Engadine National Park, Val Munster, 2 ♂♂, 2 ♀♀, 3.vii.1922, Ch. Ferrière; Peney 1 ♂, 18.v.1878, Tournier.

Variety *marginatus* Thomson

1883 *Delotomus marginatus* Thomson, *Opuscula Entomologica*, fasc. 9: 885.

Differs from the form *cephalotes* Grav. Thoms. as follows: head (Fig. 24) rather shallowly emarginate behind; for the most part moderately punctate. Clypeus rather finely punctate; at apex rather broadly almost truncate (Fig. 25), the truncation broader than in *cephalotes*. Antennal flagellum 27- to 31-segmented.

Pronotum irregularly rugose-punctate below. Propodeum with hinder lateral costae of the area superomedia usually weak or absent.



FIGS. 22-25. *Anisoctenion laetus* Grav. Head in dorsal view of Fig. 22. var. *cephalotes* Grav. Thoms. Fig. 23. var. *marginatus* Thoms. Clypeus of Fig. 24. var. *cephalotes* Grav. Thoms. Fig. 25. var. *marginatus* Thoms.

Petiolar segment on the average a little more elongate than that of *cephalotes*: laterally usually not sharply margined; with dorsal keels usually distinct to well beyond middle, but so weak as scarcely to interrupt the general convexity of the segment.

Tarsal claws rather weakly pectinate in female, weakly so in male.

Length 6 to 8 mm.

Female with flavous coloration not predominating on lower face, extending only a little way on to the genae and scarcely at all up outer orbits: male with pale margins of the inner orbits often short.

Redescribed from the following material: SWEDEN, mus. Lund, 1 ♀, Gotland, placed as *marginatus* Thoms.; mus. Stockholm, 1 ♂, 1 ♀, Gotland, det. A. Roman as *cephalotes* var. *marginatus* Thoms.: HOLLAND, Venlo, 1 ♂, 28.vi.1942, H. G. M. Teunissen, det. A. Roman as *marginatus* Thoms.: SWITZERLAND, Geneva, Peney, 1 ♂, 20.v.1889, Tournier: SPAIN, 4 ♂♂, province Madrid, province Avila, Sierra Morena, J. Abajo and A. Seyrig: ENGLAND, Cornwall, Botusfleming, 2 ♂♂, Marshall coll.; Devon, Ideford, 1 ♂, J. F. Perkins: IRELAND, Co. Sligo, Toberscanavan, 1 ♀, 22.vii.1933, Co. Clare, Clooncoose, 1 ♂, 22.vii.1924, A. W. Stelfox.

Variety *calcaratus* Thomson

1883 *Delotomus calcaratus* Thomson, *Opuscula Entomologica*, fasc. 9: 885.

The unique male type agrees with the description of *cephalotes* Grav. Thoms. in almost all respects; but it is a large dark form with the sculpture more than ordinarily pronounced. The length is 10 mm., and the petiolar segment is just over twice as long as broad. The tarsal claws may be described as strongly pectinate. The notaulices do reach the anterior margin of the mesoscutum. As indicated by Thomson, the area superomedia is not much longer than broad. The hind tibiae each bear a minute spur; but the right-hand spur is more than double the length of the left-hand one.

This specimen may be only a freak form of *cephalotes* Grav. Thoms.

Further material examined: of var. *cephalotes* Grav. Thoms.: BELGIUM, Rouge Cloitre, 1 ♀, 1849, C. Wesmael: GERMANY, Bavaria, Haag-an-der-Amper, 1 ♂, v. 1948, G. Heinrich (recorded as ? *rubiginosus* Grav., Heinrich, 1949b: 122). Of var. *marginatus* Thoms.: IRELAND, Co. Dublin, Slade of Saggart, 1 ♀, 22.vii.1936, A. W. Stelfox: ENGLAND, Surrey, Byfleet, 1 ♀, 26-29.v.1949, R. B. Benson: FRANCE, Maisons Laffitte, &c., 5 specimens, J. de Gaulle; Alpes-Maritimes, Peira-Cava, 1,500-2,000 m., 55 specimens, 1931, A. Seyrig. Of intermediate form: BELGIUM, unlocalized, 2 ♂♂, C. Wesmael: RUSSIA, Orel, 1 ♂, 25.vi.1943, R. Hinz.

The varieties *cephalotes* and *marginatus* have been kept separate at the present stage because it has proved possible to place most specimens into one or the other with confidence; but intermediate forms have now been found, as above recorded. When really adequate material is available from the whole European range of this generally scarce species, it seems likely that the varietal status will prove untenable.

Anisoctenion alacer Gravenhorst

- 1829 *Tryphon alacer* Gravenhorst, *Ichneumonologia Europaea*, 2: 132.
 1858 *Acrotomus xanthopus* Holmgren, *Svensk Vet.-Akad. Handl.* 1: 223.
 1906 *Acrotomus alacer* Pankuch, *Z. Hym. Dipt.* 6: 86.
 1907 *Anisoctenion xanthopus* Schmiedeknecht, *Die Hymenopteren Mitteleuropas*, 618.
 1911 *Anisoctenion alacer* Schmiedeknecht, *Opuscula Ichneumonologica*, 5: 2295.

Head (Fig. 19) sub-cubical, having a length behind the eyes, as seen from above, much greater than the eye length in same view; scarcely broader than thorax; moderately narrowed and very little rounded behind eyes; very broadly and shallowly emarginate behind, the margin often perceptibly sinuate: with vertex and temples rather finely punctate; with cheeks moderately and upper face also more densely punctate; with lower face moderately, or near middle more coarsely punctate; malar space more or less coriaceous. Cheeks long; convex below in front view. Clypeus (Fig. 9) elongate-pilose; sparsely and for the most part rather coarsely punctate in upper half, virtually impunctate in lower half except for a row of piliferous punctures just before the margin; basally not deeply delimited; with apical margin varying from very broadly rounded, as in the specimen figured, to rather narrowly so; in side view rather strongly or strongly convex, and not always impressed before apical margin. Malar space about equal to distance between mandibular apices, sometimes rather less. Hypostomal costa weakly raised: genal costa scarcely raised, meeting hypostomal costa far behind mandibular base.

Antennae elongate and slender; with scape strongly excised externo-ventrally; with flagellum 34- to 41-segmented.

Pronotum abnormally forwardly produced, narrowly rounded in front, and distinctly punctate on the fore part; with dorsal transverse furrow shallow, but broad and more or less longitudinally costate in middle; with epomiae rather strong in middle but indeterminate below; laterally moderately punctate above, rather strongly longitudinally rugose behind and below, more finely sculptured in male. Propleura rather coarsely punctate; anteriorly coarsely reticulate-rugose; laterally very sharply margined. Mesoscutum rather strongly and evenly convex; with notaulices short, but strongly impressed and transcostate; finely to moderately and rather closely punctate. Scutellum weakly to strongly convex; not margined to middle; finely to moderately punctate, usually impunctate and shining in centre. Mesopleura coarsely punctate below, moderately so above: sternalices broad and very superficial: mesosternum moderately and closely punctate, prepectus rather coarsely so: mesolcus indicated by a transcostate line or ridge; scarcely impressed anteriorly, broadening and merging into a wider concavity posteriorly; sometimes appearing to be closed by a strong transcosta, but continuing between cavities of mid coxae: epicnemial carina scarcely elevated, extending well up mesopleura. Propodeum elongate, rather strongly griseo-pilose; obscurely rugose discally, more or less shining near periphery; finely punctate on area externa and moderately so on area pleuralis; with costae rather weak and indefinite above, strong behind: area basalis somewhat excavate, but not sharply defined: area superomedia two to three times as long as broad, weakly arcuately trans-rugose: area posteromedia broader than long, shining, sometimes divided by a distinct median keel.

Petiolar segment 1.5 to 1.8 times length of its greatest breadth in female, 1.9 to 2.2 times in male; almost evenly explanate from near base to apex, weakly so in male, rather strongly so in female; laterally distinctly margined, with spiracular tubercles more or less prominent; with dorsal keels rising very sharply at base, margining a strongly raised medial area, approaching closely before or between spiracles, but becoming indistinct not far behind middle of segment; rather finely punctate, or in part finely rugose, beside the keels, finely punctate between and behind them. Tergite 2 with thyridia conspicuous, in male large: thyridia of tergite 3 distinct. Remainder of gaster very finely punctate. Female hypopygium large. Female third valvulae rather broad but not large; not or scarcely reaching apex of tergite 8; with ventral margin scarcely curved.

Fore wings with basal and disco-cubital veins decidedly divergent; with areolet sessile or very shortly petiolate; with nervus parallelus emitted below middle of brachial cell. Hind wings with nervellus rather strongly antefurcal, intercepted far below middle.

Legs elongate and slender. Claws of all tarsi rather strongly to strongly pectinate.

Length of female 8 to 10, of male 8½ to 11 mm.

Head black, with the following parts stramineous to flavous, margined by fulvous (the colour often appearing to have been dulled by cyanide vapour): clypeus, except for a broad basal margin, and mandibles except at apex. Palpi more or less rufo-testaceous. Antennae ferrugineous or darker, darker above; usually with a series of basal segments at apical margin, and annellus mainly, distinctly paler. Thorax and propodeum black; with humeral angles of pronotum, tegulae, and metategulae stramineous to flavous, the pronotal marks usually margined with fulvous. Legs mainly rufous to rufo-testaceous; with fore and mid tarsi at apex, hind tarsi largely, and hind tibiae sometimes at apex, darker; with coxae often darker in part; with fore coxae and fore and mid trochanters in front often flavous. Wings with veins ferrugineous to testaceous, much paler at base; with stigma pale testaceous. Gaster black; with thyridia castaneous; with tergites 2 to 7 usually finely pale-margined: in male to some extent pale beneath, especially on fore part; in female with hypopygium and region behind it rufous to ferrugineous, and with preceding sterna stramineous to ochreous or citreous.

Redescribed from the following material: ENGLAND, Stephens coll., 1 ♂, 2 ♀♀; Devon, Newton Abbot, 3 ♂♂, 1 ♀, R. C. L. Perkins and J. F. Perkins; Lancs., Manchester, Mersey banks, 1 ♀, L. Nathan, 6 ♂♂, 2 ♀♀, G. J. K.: BELGIUM, Sysseele, Groenendael, Stockal, Cortenaeken, Charleroy, 12 ♂♂, 2 ♀♀, Wesmael and Tosquinet coll.: GERMANY, ? Bavaria, 3 ♂♂, 2 ♀♀, Buchecker coll.; Silesia, Mühlbach, 1 ♂, K. Hedwig.

Further material seen: ENGLAND and GERMANY, 25 specimens in British Museum collection: SWEDEN, material in Holmgren collection: FRANCE, Haute Marne, Clerc; Rambouillet, J. de Gaulle (altogether 4 specimens): AUSTRIA, holotype. Recorded from Holland (Teunissen, 1948) and Czechoslovakia (Gregor, 1929). The Woldstedt specimen recorded from Finland is a female *Cteniscus similis* Hlgr.

All the dates, where recorded, are in the months of September and October, usually in the first three weeks of October.

The Silesian male, kindly given me by Rektor K. Hedwig in 1936, was compared with the type in the Gravenhorst collection. The synonymy of *xanthopus* Hlgr. was confirmed in Stockholm in 1937.

Morley (1911) quoted the description of *Tryphon anceps* Stephens (1835), which he considered to be 'almost indubitably synonymous'. Stephens's specimen is not to be found in the British Museum collection; but from the description and date of capture, I consider such synonymy to be not at all probable.

This is a rather isolated species within the genus. The elongate, greyish-black body caused some earlier workers to confuse it with *Dyspetes praerogator* Grav., which it superficially resembles. Peculiar features are the forwardly produced pronotum, the ill-defined, transcostate mesolcus, and the elongate legs, including particularly slender hind femora (Fig. 16). Notable also are the transcostate notaulices, the elongate areola, and the sharply raised medial area of the petiolar segment. The sub-cubical head and colour pattern of the clypeus it has in common with an apparently new species, of which two males are available, and which is here briefly diagnosed but not validated. But that species does not share with it any of the other features mentioned in the present paragraph.

Biology. Herr Rolf Hinz has taken this species in the Hannover district in October, flying between grass in the woods. He finds that it parasitizes species of *Tenthredopsis*. The egg is laid externally not far behind the head of the host larva. This makes no defensive movements, and the parasite may ride it for a considerable time.

Clausen (1932) studied the life-history of a species determined as *A. alacer* Grav. It was parasitizing a species of '*Allantus*' on oak at Suigen in Korea. R. B. Benson tells me this would probably be *Allantus* (= *Emphytus* auctt.) *togatus* Panz. or some related species.

Anisoctenion genalis Thomson

This species may be diagnosed by the sum of the characters leading to it in the key to species (pp. 350-354).

Diagnosed from the following material: ENGLAND, Devon, Dartmoor, 1 ♂, 8.vi.1935, R. C. L. Perkins: AUSTRIA, Styria, Bösenstein Massif, 1,800 m., 1 ♂, 8.vi.1950, G. Heinrich: see also supplement (p. 454 below).

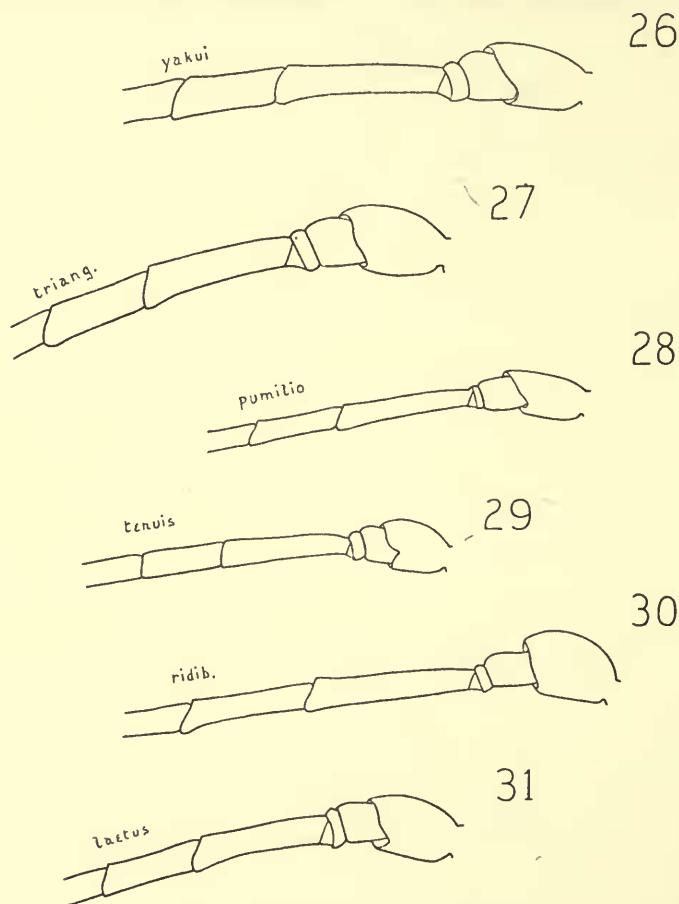
This species forms a connecting link with the genus *Cteniscus*. When further material was seen in 1952, including both sexes, I was able to determine it. A description is given in the supplement (p. 452 below).

KEY TO PALAEARCTIC SPECIES OF *ANISOCTENION* FÖRSTER

1. Female third valvulae more or less distinctly decurved (Fig. 15): mesopleura more or less coarsely and closely punctate and either epicnemial carina strongly raised or malar space very short: hypostomal costa raised into a rather sharp tooth in known European species 2
- Female third valvulae not thus distinctly decurved: neither epicnemial carina strongly raised nor female malar space very short: if the male malar space is very short the mesopleura are rather finely and sparsely punctate: hypostomal costa, if rather strongly, then very obtusely and roundedly raised 4

2. Clypeus very strongly transverse, not coarsely punctate nor deeply or sharply delimited: malar space not very short: flagellum 24- to 30-segmented: epicnemial carina strongly raised between sternaules: hypostomal costa raised into a rather sharp tooth where met by genal costa: larger specimens are rather stoutly built *rubiginosus* Grav.
 Clypeus less transverse, coarsely punctate or at least with some coarse punctures, and deeply or at least sharply delimited: malar space very short in both sexes: flagellum 32- to 36-segmented: epicnemial carina very slightly raised: species of rather slender build 3
3. Hypostomal costa raised into a rather sharp tooth where met by genal costa (as in *rubiginosus* Grav.): female hypopygium not sharply folded mid-ventrally: claws of all tarsi very strongly pectinate: antennal scape shorter (Fig. 27): Europe. *triangulatorius* Grav.
 Hypostomal costa weakly raised, not at all 'dentate': female hypopygium sharply folded mid-ventrally: tarsal claws no more than moderately pectinate: antennal scape longer (Fig. 26): Japan, unknown in Europe *yakui* Uchida
4. Head not broadened or sub-cubical, not longer behind eyes than eye length, seen from above: either mesopleura rather finely and sparsely punctate or tergite 2 and female hypopygium as in second half of couplet 5 5
 Head broadened or sub-cubical, distinctly longer behind eyes than eye length, seen from above: mesopleura strongly punctate in lower half: tergite 2 and female hypopygium not so 10
5. Mesopleura finely or rather finely punctate: sternaules strongly impressed: tergite 2 and female hypopygium not as in alternate 6
 Mesopleura moderately or strongly punctate below: sternaules no more than moderately impressed: tergite 2 with a pair of diagonal furrows extending outward from base: female hypopygium sharply folded mid-ventrally 9
6. Head strongly narrowed behind eyes (Fig. 18): tarsal claws with pectination absent or weak: female third valvulae not as in alternate 7
 Head no more than moderately narrowed behind eyes: tarsal claws moderately and very distinctly pectinate: female third valvulae moderately broad in side view and very broad as seen from above, almost 'vomeriform', shortly and densely hairy below: NE. Burma, Formosa sp.
7. Propodeum strongly raised to base of area superomedia, which is little longer than broad: petiolar segment not $1\frac{1}{4}$ times as long as broad
 cf. *Cteniscus rufonotatus* Hlgr.
 Propodeum not thus strongly raised, with area superomedia distinctly longer than broad: petiolar segment more than $1\frac{1}{2}$ times length of its greatest breadth 8
8. Pedicellus abnormally elongate (Fig. 28), narrower below than width of malar space: flagellum 22- to 25-segmented: scutellum not margined to middle: propodeum short, with area posteromedia roughly quadrate: petiolar segment up to twice length of its greatest breadth: Europe *pumilio* Hlgr.

Pedicellus short and stout (Fig. 29), broader below than width of (male) malar space: flagellum 28- to 31-segmented: scutellum sharply margined to beyond middle: propodeum long and not at all sharply declived, with area posteromedial strongly transverse: petiolar segment more than three times length of its greatest breadth: female unknown: NE. Burma, Formosa . *tenuis* sp. n.



FIGS. 26-31. Antennal scape and following segments, in sinistro-lateral view, of Fig. 26. *Anisoctenion yakui* Uchida. Fig. 27. *Anisoctenion triangulatorius* Grav. Fig. 28. *Anisoctenion pumilio* Hlgr. Fig. 29. *Anisoctenion tenuis* sp.n. Fig. 30. *Anisoctenion ridibundus* Grav. Fig. 31. *Anisoctenion laetus* Grav. var. *marginatus* Thoms.

9. Pronotum and prepectus not with abnormal developments as in alternate: post-annellus about one and a third times length of the following antennal segment, measured along inner margin (Fig. 30): petiolar segment not more than about twice the length of its greatest breadth; with dorsal keels distinct though short: tergite 3 almost entirely black or blackish: length 9 mm. or less: Europe .

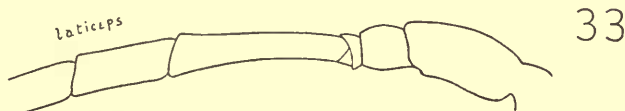
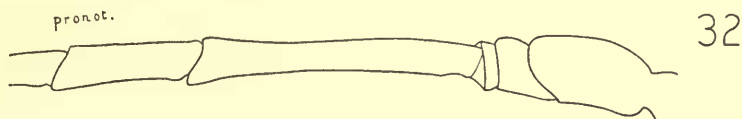
ridibundus Grav.

Pronotum with lateral margins suddenly expanded to produce broad flanges:

prepectus with a pair of sharp keels which close the fore coxal cavities laterally: postannellus twice the length of the following antennal segment, similarly measured: petiolar segment 2.8 times length of its greatest breadth; with dorsal keels scarcely indicated: tergite 3 almost entirely red: length 10 mm. or more: NE. Burma, Formosa *pronotalis* sp. n.

10. Head more or less broadened and strongly rounded behind eyes (Figs. 22, 23): clypeus not coloured as in alternate II

Head sub-cubical, slightly and almost rectilinearly narrowed (Fig. 19): clypeus stramineous to flavous, margined with fulvous; and with a broad, blackish band along basal margin. 14



FIGS. 32-33. Antennal scape and following segments, seen from above, of Fig. 32. *Anisoctenion pronotalis* sp. n., illustrating especially the elongate postannellus. Fig. 33. *Anisoctenion laticeps* Grav., illustrating especially the elongate scape.

11. Scape very elongate (Fig. 32): clypeus as in Fig. 8: female third valvulae very broad, extending well beyond apex of tergite 8 (Fig. 21): male genae, like those of female, largely flavous *laticeps* Grav.

Scape not unusually elongate (Fig. 31): clypeus as in Figs. 24, 25: female third valvulae not broad, scarcely projecting beyond apex of tergite 8; pale coloration scarcely touching genae of male (*laetus* Grav. agg.) 12

12. Head rather shallowly emarginate behind (Fig. 23): clypeus at apex rather broadly almost truncate (Fig. 25): malar space much shorter than distance between mandibular apices: tarsal claws more weakly pectinate in each sex respectively: female with flavous coloration not predominating on lower face, extending only a little way on to the genae and scarcely at all up the outer orbits *laetus* Grav. var. *marginatus* Thoms.

Head moderately emarginate behind (Fig. 22): clypeus with apical margin in middle almost truncate (Fig. 24), more narrowly so than in var. *marginatus*: malar space not much shorter than distance between mandibular apices: tarsal claws more strongly pectinate in each sex respectively: female with flavous coloration predominating on lower face, extending broadly on to the genae and about a quarter the way up the outer orbits 13

13. Area superomedia distinctly longer than broad: hind tibiae with no spur *laetus* Grav. var. *cephalotes* Grav. Thoms.

Area superomedia not much longer than broad: hind tibiae each bearing a minute spur: unique male *laetus* Grav. var. *calcaratus* Thoms.

14. Pronotum strongly produced forward: mesolcus not distinctly impressed, indicated by a transcostate line or ridge: legs, particularly hind femora (Fig. 16), elongate and slender: antennal flagellum 34- to 41-segmented: a rather large species, length 8 to 11 mm., with male of elongate and slender build, and with gaster mainly greyish-black *alacer* Grav.

Pronotum not strongly produced forward: mesolcus distinctly, though not deeply impressed: legs, particularly hind femora, not nearly so elongate and slender: antennal flagellum less than 34-segmented 15

15. Pronotum laterally above and mesoscutum rather coarsely and closely punctate; gaster shallowly, but for the most part moderately and closely punctate: gaster with tergites 2 to 4 red *genalis* Thoms.

Pronotum laterally above and mesoscutum finely punctate; gaster for the most part extremely finely punctate: gaster blackish or deep castaneous, with tergites finely pale-margined at apex: male unknown to me

. cf. *Cteniscus similis* Hlgr.

Genus *EXENTERUS* Hartig

1837 *Exenterus* Hartig, *Arch. Naturgesch.* 3 (1): 156.

Tricamptus Förster 1868, Thomson 1883 *non* Woldstedt 1874, **syn. n.**

Picroscopus Förster 1868, **syn. n.**

Picroscopus Thomson 1883 *non* Förster.

Picroscopus Davis 1897, synonym by Roman 1913.

Like the majority of Förster's genera, *Picroscopus* was founded without the citation of any species. It was adopted by Thomson for the single species *Tryphon ictericus* Grav., and has been understood thus by later authors.

Förster's diagnosis of *Picroscopus* was extracted from his key to genera and quoted by Schmiedeknecht as follows: 'Flügel mit Areola; Hintertibien ohne Sporn; Fußklauen gekämmt; Hinterleib breit sitzend, das 1. Segment gleich hinter der Basis stark erweitert und von da nach der Spitze hin fast unmerklich erweitert; Area superomedia nicht scharf umgrenzt, breiter als lang.' It has been overlooked that *ictericus* Grav. has non-pectinate claws: it disagrees, therefore, with the original generic description and, according to the interpretation of the rules generally accepted in Europe, it cannot serve as type.

Picroscopus Davis 1897 has already been synonymized with *Exenterus* by Roman (1913). Davis included two species, *Exenterus canadensis* Provancher 1883 and *Exenterus hullensis* Provancher 1886. In his key to genera (p. 227) Davis placed *Picroscopus* in a section with tarsal claws pectinate; but Cushman (1940), in his review of *Exenterus*, placed *hullensis* Prov. in a section with tarsal claws not pectinate in female. If the claws are simple in the male also, *hullensis* Prov., like *ictericus* Grav., could not serve as type.

Cushman accorded *canadensis* Prov. fuller treatment, but the identity of that species has been in doubt. In case any attempt should be made to upset Cushman's opinion, I propose to clinch the matter by proposing an alternative type.

Schmiedeknecht continues: 'Aus Försters hinterlassenen Schriften habe ich nun ersehen, daß er als Typus dieser neuen Gattung den *Exenterus oriolus* betrachtet hat; darauf würde wohl Niemand kommen, denn bei allen Exemplaren dieser Art, die ich untersucht habe, ist der Metathorax deutlich gefeldert, speciell die Area superomedia *gut* umgrenzt [*italics mine*], weit besser würden sich *E. cingulatorius* und *ictericus* als Typen für die Gattung eignen. Abgesehen von der Felderung des Metathorax paßt *E. oriolus* ganz gut auf die Diagnose.'

Now the nature of the bordering of the area superomedia is not easily amenable to exact definition, for it is not comparable to that occurring in, for example, *Coelichneumon*, but consists of rugosities of inconstant shape. Having before me three specimens of *oriolus*, I found that in one specimen the rugosities that border the area superomedia are raised distinctly above the others, in another they are not. While one may agree with Schmiedeknecht that the area superomedia is well bordered, I do not think it can be asserted that it is always sharply bordered. Since the evidence is that for *Picroscopus* Förster meant *oriolus* Hart. I think we should give that author the benefit of the doubt. Accordingly, as a precautionary measure, I select *Exenterus oriolus* Hartig 1838 as type of the genus *Picroscopus*, which falls into synonymy with *Exenterus*.

I intend to treat *ictericus* Grav. as a species of *Exenterus*. Apart from the coloration, it is said to differ from other known European species in having the petiolar segment angularly projecting at the base and not auriculate, and in the absence of a costula. A noteworthy character is that tergite 2 bears coarse but well-separated punctures, and is not or scarcely at all rugose. However, in *hullensis* Prov. and in smaller specimens of *adsperus* Hartig and other species, tergite 2 bears well-separated punctures over a large part of the area, and is rugose only at base and in middle. Cushman (1940) separated off a group of four North American species, including *canadensis* Prov., in which the basal carina is absent. In the shape of the petiolar segment I recognize no generic separation which appears, therefore, to break down. I am much indebted to Dr. H. K. Townes for sending me specimens of *canadensis* Prov. and *hullensis* Prov. and thus enabling me to check the points at issue. This new synonymy has been published by Mason (1951, April: 229)

The position of '*Tricamptus*' *apiarius* Grav. has been considered in the discussion of genera (p. 316).

The genus *Exenterus* has recently been revised by Cushman (1940). His paper is, of course, a very notable advance on the work of Schmiedeknecht, who began his key to species with a consideration of the coloration of the fore-legs; but even Cushman has not made adequate use of the characters afforded by the anterior part of the mesosternum. Moreover, an examination of the main European museum collections has yielded further results previously unpublished. The key to species that follows is based on Cushman's work, but incorporates such additions and modifications as I have found desirable. The determination of single males, however, remains often a matter of considerable difficulty or uncertainty.

Exenterus apiarius Gravenhorst

Most of the salient characters have been mentioned by other authors, but the following should be added: epicnemial carina distinctly, rather weakly or moderately raised: antennal scape elongate, deeply excised ventrally, its dorsal about, usually just over, twice its ventral length. The hypostomal costa is strongly raised and falls gradually to occipital foramen; and the double genal costa is similar to that of *Exyston genalis* Thoms. (Fig. 51). In well-developed specimens the scutellum has, in about apical half, a saucer-like depression, with a distinct margin in front and at sides.

Recorded in each month from May to September; the earliest day of a specimen seen by me being 17.v.1854 (male, Ruthe coll.), and the latest 10.ix (Rebais, nr. Fontainebleau, de Gaulle).

Specimens seen from Wales, England, Holland, Belgium, France, Germany, Sweden, Poland (Przepalkowo, viii.1925, G. Heinrich, mus. Paris), Russia (Perm, ♀, Lubischew, mus. Paris).

Exenterus abruptorius Thunberg

The hind margin of the cavities of the fore coxae is raised, but not bidentate: therefrom radiate strong keels to the epicnemial carina, weaker in male. Tergite 2 of gaster is generally slightly less than twice as broad as long. Antennal scape rather weakly excised externo-ventrally. For other characters, see comparison under *oriolus* Hart., and also key to species. See also Pl. 4.

Biology. This has been studied by Clausen (1932, under *coreensis* Uchida) and by Morris (1937). The species has been reared from *Diprion pini* L. and *Neodiprion sertifer* Geoffr.

The dates of emergence of reared specimens are obviously affected by laboratory conditions: in the field the adults are known to appear in the last ten days of June and in early July.

Specimens seen from England (see Kerrich, 1935), Germany (mus. Munich), Sweden (Holmgren and Thomson collections; Morris, Cameron, & Jepson), Finland (V. Saarinen; G. J. K.), France (Braunschweig and Alpes Maritimes, mus. Paris), Spain (Valencia, Cañada, Giner Mari).

Reliably recorded also from Czechoslovakia (Gregor, 1929). Doubtfully recorded from Belgium (Tosquinet, 1890). Not yet found in Holland. Introduced to Canada, but apparently failed to become established.

Exenterus simplex Thomson

Thomson (1883) made the statement 'mesosterno et unguiculis simplicibus'. Roman (1912, 1913) did not see Thomson's types, but found in Thunberg's collection specimens which appeared to agree with Thomson's description, and he regarded *simplex* as a dwarf form of *abruptorius* Thunb. Thomson's mention of locality leaves no doubt that the type is correctly identified. Examination of this type under the microscope at a favourable angle and with good illumination shows that the hind

margin of the cavities of the fore coxae is, in fact, very strongly raised and strongly bidentate. The keels towards epicnemial carina are very weak and only basally developed.

Another specimen stands in the Thomson collection and has for locality only 'Suecia'. Dr. Kjell Ander informs me that the two small coloured labels indicate that it was collected by J. W. Zetterstedt in Gotland in July-August 1841.

***Exenterus oriolus* Hartig**

1838 *Exenterus oriolus* Hartig, *Jahresber. Fortschr. Forstw.* 1: 270.

1883 *Exenterus flavellus* Thomson, *Opuscula Entomologica*, fasc. 9: 887.

This synonymy is correct. Thomson's unique type was taken by Dahlbom on a pine needle beside a larva of *Diprion similis* Hart.; and the published locality is Kjefflinge, which is north-west of Lund.

Cushman (1940) could find no structural characters to separate this species from *abruptorius* Thunb., and wrote that it might be a colour form of it. The proportions of the head and malar space (see key to spp., pp. 364-365) and the structure of the mesosternum appear to me to render it distinct. The margin of the cavities of the fore coxae is not raised behind, but only weakly at sides, and the keels towards epicnemial carina are absent or very few. In female, the yellow colour extends about three-quarters way up eye behind it, as against about a quarter the way up in *abruptorius*. In male, the yellow bands of the first two tergites are much broader than those of following: not so in *abruptorius*.

E. oriolus appears to be a slightly shorter and stouter species than *abruptorius*: the hind legs are noticeably a little shorter and stouter relatively, and tergite 2 is slightly more than twice as broad as long in a few female specimens measured. The scape is a little more deeply excised in *oriolus* (but not sufficiently so for diagnosis); and the average number of flagellar segments is smaller, ranging from 25 to 29 as compared with 27 to 32 in *abruptorius*. The tarsal claws are less strongly pectinate.

Finally, the suggestion made to me that this is a southern colour-form of *abruptorius* is now further contra-indicated by the distributional data; for I know *abruptorius* from near the Arctic Circle down to the Spanish province of Valencia. The female specimen taken in that province is rather more extensively and brightly yellow-coloured than those from more northerly latitudes, but does not approach female *oriolus* in colour pattern.

Biology. Reared from *Diprion pini* L. and *Neodiprion sertifer* Geoffr.; and it seems likely that *D. similis* Hart. is also involved: Schmiedeknecht (1911) mentions also *Gilpinia variegata* Hart. and *frutetorum* Fabr.

Material seen from Sweden (Thomson coll.), Germany (Ruthe coll., Th. Kupka coll.), Holland (H. G. M. Teunissen coll.: Teunissen, 1948), Spain (Teruel, Orihuela del Tremedal, ex *D. pini* L.). Also recorded from France (Maneval, 1925) and Hungary (Cushman, 1940). Material obtained by Farnham House Laboratory staff, perhaps from Hungary, also seen.

Dates: Maneval's specimen was captured on 28.vii.1924; and the recorded emergences are on dates later in the year.

***Exenterus ictericus* Gravenhorst**

1829 *Tryphon ictericus* Gravenhorst, *Ichneumonologia Europaea*, 2: 208.

1858 *Exenterus ictericus* Holmgren, *Svensk Vet.-Akad. Handl.* 1: 235.

1883 *Picroscopus ictericus* Thomson, *Opuscula Entomologica*, fasc. 9: 888.

The cheeks and malar space are short. The margin of cavities of fore coxae is strongly raised, and very strongly emarginate medially, as in *amictorius* Panz.: laterally it extends strongly to the fore margin behind lower angle of pronotum: ventrally there often extend from the margin to the epicnemial carina a series of weak keels producing the appearance of a row of large quadrangular punctures. The mesolcus is closed behind. The clypeus sometimes bears a pale spot: the pale anterior marks of mesoscutum are frequently missing.

Schmiedeknecht stated that the male was unknown: in fact there is very little sexual dimorphism, but in the male the dorsal keels of the petiolar segment are distinct almost to apex.

In one male specimen from the Swiss Jura the costulae are present, though weak and incomplete.

Biology. Bred from the Diprionid sawfly, *Monoctenus juniperi* L. (Forsius, 1911).

Material examined as follows: FINLAND, Kuusamo, Paanajärvi, Ruskeakallio, 1 ♀, 14.viii.1935, G. J. K. (compared with type viii.1938): SWEDEN, Jämtland, 3 ♂♂, mus. Stockholm; Holmgren coll.; Thomson coll.: BELGIUM, Béverloo, 3 ♂♂, 1 ♀, 26.vi.1867, J. Tosquinet: GERMANY?, 1 ♂, 2 ♀♀, Buchecker coll.: SWITZERLAND, Geneva, Peney, 2 ♂♂, 3 ♀♀, 10.vi-30.vii, 1885-1889, Tournier; Engadin National Park, 4 ♂♂, 24.vii-2.viii; Swiss Jura, le Crit, long series, vii.1935, A. Seyrig: FRANCE, 1 ♀, holotype; Alpes-Maritimes, long series, 1931, A. Seyrig: SPAIN, 1 ♂, viii.1904, J. Dusmet: ITALY, Piedmont, Biella, Val Chiobbia, 2 specimens, viii.1928, F. Capra: YUGOSLAVIA, Prenj Mts., 1 ♂, 15.viii.1936, V. & E. Martino.

Recorded from Germany (Thuringia: Schmiedeknecht, 1911); also from Czechoslovakia (Ruthenia, Ubušin, vi.1928: Gregor, 1929) and from Bulgaria (Rila Planina, 15-16.vii.1931: Gregor, 1933).

Dates of appearance of this species thus range from the end of June to early September.

***Exenterus amictorius* Panzer**

This species has been generally known as *Exenterus marginatorius* Fabr. For the rejection of *Ichneumon marginatorius* Fabricius 1793 as a homonym of *Ichneumon marginatorius* Rossi 1790, and the substitution of the next available name, I follow Cushman (1943). He has reproduced Panzer's original description and figure, and I agree that these must have been intended to represent the species in question. The hind tibial spurs may have been added as an afterthought, their absence not having been noted at that time.

Hind margin of cavities of fore coxae strongly raised and bidentate: keels therefrom to epicnemial carina absent or very weak. Antennal scape very weakly excised externo-ventrally (Fig. 34). The extent of yellow coloration on the gaster is very variable. The tarsal claws are stated by Schmiedeknecht to be simple: they are,

however, pectinate, at least in the female, though the pectination is weaker and less regular than in female *abruptorius*. Petiolar segment (Fig. 39).

Biology. Recorded as reared from *Diprion pini* L., *D. similis* Hart., *Neodiprion sertifer* Geoffr., *Gilpinia pallida* Klug, *virens* Klug and *polytoma* Hart. Oviposition on *D. pini* L. described by Scheidter (1934).

Dates of captured specimens range from early June to the end of September.

Material seen from England (see Kerrich, 1935), Belgium (Wesmael-Tosquinet coll.), Germany (Hartig coll., Ruthe coll.), Austria (G. Heinrich), Czechoslovakia, Poland, Sweden, Finland, Switzerland, France, Spain. Also recorded from Holland (Teunissen, 1948). Introduced to Canada, where it has become established.

***Exenterus claripennis* Thomson**

1883 *Exenterus claripennis* Thomson, *Opuscula Entomologica*, fasc. 9: 887 (non Cushman, 1940).

The Thomson specimen under this name in the Lund collection is labelled 'Nerike' and is referable to *amictorius* Panz.: the type from Wittsiö in northern Skåne appears to be lost (cf. Roman, 1913). The other specimen standing under that name in the collection was taken by R. Malaise around Torneträsk, and is a later addition.

Two specimens standing under *claripennis* in the Stockholm museum were examined in 1935, and regarded as distinct from others then known to me. One bears the determination label of A. Roman who had, evidently, recognized it subsequently to the appearance of his 1913 paper, but had not, I believe, published any note to this effect. R. Malaise kindly sent me this female specimen for further study, and I now agree this species to be the true *claripennis* for the reasons which follow.

Roman wrote (1913) that he found, in Thomson's description of *claripennis*, no reliable difference from *adspersus* Hart., that Thomson had not mentioned this species with its synonym *lepidus* Hlgr., and that he thought Thomson had redescribed the 'to him unknown' *adspersus* as *claripennis*. In actual fact he redescribed *adspersus* as *laricinus*, and used the words '... ab *E. lepto* pictura uberiore distinctus'. So his conception of *lepidus* may have been the species now described as *confusus*.

Thomson gave for *claripennis* '*E. marginatorio* ... valvula ventrali ♀ apice magis acuminata discedens'. Now the degree of pointedness of the female hypopygium is, when not extreme, a difficult character to use, for the appearance depends largely on the degree of folding or flattening of that organ: in *amictorius* (*marginatorius*) it seems inconstant; but the condition in the species here identified as *claripennis* might fit 'magis acuminato', whereas that in *claripennis* Cush., I think, would not, and *tricolor* has the female hypopygium beyond all comparison more pointed. Had Thomson had *tricolor*, it is unlikely that he would have omitted to mention the red coloration of the underside of the gaster. Thomson wrote 'mesosterni acetabulis haud bidentatis': in this species the acetabulae (marginating the fore coxal cavities) are distinctly developed and laterally raised but not ventrally bidentate, whereas in *claripennis* Cush. and in *tricolor* they are absent or rudimentary.

Very closely related to *amictorius* Panz., from which it differs as given in key to species (p. 366).

Another authority to mistake *claripennis* was Kriechbaumer: two specimens he

determined thus prove to be *vellicatus* Cush. They were bred from the same host as were Cushman's types.

E. claripennis Thoms. diagnosed from the following material: SWEDEN, Dalarne, Fulufjäll, 1 ♀, vii.1927, on snow field, K. H. Forsslund (neotype); Småland, 1 ♀, Boheman; det. A. Roman; ?Blekinge, Åryd, 1 ♂, 1 ♀, *ex Neodiprion sertifer* Geoffr., Morris, Cameron, & Jepson, det. G. J. K.

Further material seen: AUSTRIA, Styria, Bösenstein massif, 1,800 m., 1 ♂, 7.vii.1950; Ardning, 600 m., 1 ♀, 11.viii.1950, G. Heinrich: FINLAND, Kangasala, 1 ♂, R. Frey.

***Exenterus adpersus* Hartig**

1838 *Exenterus adpersus* Hartig, *Jahresber. Fortschr. Forstw.*, **1**: 271 (non Morris, Cameron, & Jepson, 1937).

1858 *Exenterus lepidus* Holmgren, *Svensk Vet.-Akad. Handl.* **1**: 231 (non Thomson, 1888).

1888 *Exenterus laricinus* Thomson, *Opuscula Entomologica*, fasc. 12: 1254-1255.

1911 *Exenterus adpersus* Schmiedeknecht, *Opuscula Ichneumonologica*, **5**: 2307.

1913 *Exenterus adpersus* Roman, *Ent. Tidskr.* **34**: 127.

1940 *Exenterus adpersus* Cushman, *U.S. Dept. Agric. Misc. Publ.* **354**: 6-7.

Holmgren (1858) himself suggested the possibility of his species being synonymous with *adpersus* Hartig. Thomson (1888), however, redescribed *adpersus* as *laricinus* (see below), which he compared with *lepidus* Hlgr. To which species he attributed *lepidus* must remain in doubt, for none is to be found under that name in his collection. Apart from Thomson, no one questioned the synonymy until in 1935 the present author wrongly, as will be seen below, placed another species as *lepidus* (Kerrich, 1942).

Dr. E. O. Engel very kindly directed my search for the type in the Zoologische Statssammlung in Munich, but we were unable to find it. Cushman (1940) gave the first clear picture of this species, including a figure of the apex of the gaster: he also identified the species with *laricinus* Thoms., which latter name he placed in synonymy. I can support this procedure with further evidence, for I was able to borrow from Munich a specimen (dated 9.ix.1884) placed as *adpersus* by Kriechbaumer who, more than anyone, should have been familiar with Hartig's work. This specimen I found, by direct comparison in Lund, to agree with Thomson's *laricinus*. It agrees, moreover, with the characters given by Cushman (1940).

Dr. Roman, when arranging the collection of Swedish Ichneumonidae in the Stockholm museum in the years 1937-1940, selected lectotypes of the Holmgren species. The lectotype of *Exenterus lepidus* is a female specimen taken by Boheman in the Swedish province of Dalarne: by direct comparison in 1947, I find it specifically identical with the above-mentioned Munich specimen, though rather more strongly sculptured.

Further material examined: ENGLAND, Hants, New Forest, Matley Bog, 1 ♂ em. 1935, *ex* Diprionid cocoon (viii.1934), A. J. Duarte (Kerrich, 1942, as *lepidus* Hlgr.); Surrey, Dorking, Westcott, 1 ♂, 1.ix.1948, G. J. K.; Beds., Clophill and Apsley Heath, 2 ♂♂ em. iv.1948, *ex* *Diprion similis* Hart. (larvae ix.1947), V. H. Chambers: BELGIUM, 1 ♂, coll. Wesmael: SWEDEN, material in Holmgren coll.; Norrbotten, Boden, 1 ♀, 9.vii.1938, K. J. Hequist: FINLAND, Karislojo, material reared from *Gilpinia*

pallida Klug by R. Forsius (Forsius, 1911: 100; Roman, 1911: 201); Karislojo, 1 ♂, 1 ♀, ex *Diprion pini* L., R. Forsius (mus. Paris): GERMANY, 5 ♀♀, coll. Ruthe; Schirmer, 1 ♀, 2 ♂♂, ix.1905, Buckow (mus. Stockholm); Saxony, Vogtland, 1 ♂, ex *Diprionid* cocoon (mus. Paris): SWITZERLAND, Nyon, 1 ♂, Cheyr: FRANCE, Toulouse, 2 ♂♂ em. iv.1925, ex *Diprionid* cocoons, Delmas.

For a note on the British specimen recorded as *lepidus* Hlgr. see below under *confusus*.

Biology. Bred from *Diprion pini* L., *D. similis* Hart., and *Gilpinia pallida* Klug (see above): recorded also from *D. nipponicum* Rohwer, *G. polytoma* Hart. and *Neodiprion sertifer* Geoffr. (Cushman, 1940).

***Exenterus tricolor* Roman**

For characterization, see key to species and subsequent discussion of differences between the males. I find no reliable difference from *adspersus* Hart. in the amount of yellow coloration of the males, such as is suggested by Roman (1913: 127); but an average difference might be demonstrable if the two species were taken together in several different localities.

Material examined as follows: FINLAND, Finström, 1 ♂, 24-29.vii.1946, W. Hellén; Vichtis, 1 ♂, R. Frey: SWEDEN, type material of A. Roman; Skåne, Skäralid, 1 ♂, 1.vii.1938, D. M. S. & J. F. Perkins: GERMANY, 1 ♀, coll. Hiendlmayr (mus. Munich), compared with type; Köln, 1 ♀, 16.viii., 1 ♂, 23.viii.1946, W. Aerts: CZECHOSLOVAKIA, Riesengebirge and Tyssa, 5 ♀♀, Morris, Cameron, & Jepson: AUSTRIA, Styria, Admont, Kaiserau, 1,100 m., 1 ♂, 10.vi.1950, G. Heinrich.

Biology. Reared from *Gilpinia polytoma* Hart. in Finland (Forsius, 1932); and from this species and *Neodiprion sertifer* Geoffr. in Czechoslovakia and Saxony by Morris, Cameron, & Jepson (1937). These three authors give an extensive account of the life-history.

***Exenterus vellicatus* Cushman**

For characterization, see key to species and subsequent discussion of differences between the males.

Material examined as follows: GERMANY, 1 ♀, 30.vii.1884, 1 ♀, 23.vii.1886, both ex *Gilpinia polytoma* Hart., 1 ♂, 11.viii.1888, coll. Kriechbaumer (mus. Munich); Holstein, Trittau, Hahnheide, 2 ♀♀, ix.1945, 3 ♂♂, vi.1946, G. Heinrich: CZECHOSLOVAKIA, several localities as recorded, 5 ♂♂, 11 ♀♀, ex *Gilpinia polytoma* Hart., Morris, Cameron, & Jepson (1937: 377, as *Exenterus* sp.). Recorded as established in Canada (Mason, 1951 April: 229).

***Exenterus confusus* sp. n.**

1888 ?? *Exenterus lepidus* Thomson, *Opuscula Entomologica*, fasc. 12: 1255 (non Holmgren, 1858).

1937 *Exenterus adspersus* Morris, Cameron, & Jepson, *Bull. ent. Res.* **28**: 375-376 (non Hartig, 1838).

1940 *Exenterus claripennis* Cushman, *U.S. Dept. Agric. Misc. Publ.* **354**: 3, 9 (non Thomson, 1883).

This species was taken in several specimens in northern Finland in 1935 by the present writer. It runs down in Schmiedeknecht's key to *adspersus* Hartig, and was determined thus in September 1935; with how much assistance from Dr. Roman I cannot now remember, but at least with his concurrence.

It is clearly the species identified by Cushman (1940) as *claripennis* Thoms. It has the posterior face of the propodeum generally less nearly perpendicular than in *amictorius* (*marginatorius*), as stated by Cushman; whereas in the species here identified as *claripennis* that face is rather more so. Reasons for rejecting Cushman's interpretation are given above.

As Cushman (op. cit.) supposed, this is indeed the species reported by Morris, Cameron, & Jepson as *adspersus* Hartig: I saw part of their material, and bear part responsibility for the identification. Later, after seeing the true *adspersus*, I supposed that this species must be *lepidus* Holmgren. The males, however, had still not been separated: a British specimen of *adspersus* was misidentified and recorded as *lepidus* in 1942; but in the absence of further explanation, the usual synonymy was followed by Kloet & Hincks (1945).

Diagnosis. Species with the characters given by Cushman (1940) for *claripennis* Thomson, and with those given for this species in the key below. In the female sex very distinct from *adspersus* in having the hypopygium not acute or ventrally folded, the third valvulae not reaching the apex of the gaster, and the mesosternum and pleura not largely yellow-marked.

Head moderately to strongly narrowed behind eyes, shallowly emarginate behind: on vertical region, temples and most of genae rather coarsely to coarsely and closely punctate; near malar space, and on lower face in greater part (except in smallest specimens) and upper face reticulate-punctate: upper face often with a distinct median keel. Clypeus generally distinctly alutaceous, rather finely to rather coarsely punctate above the pre-apical impression; rather strongly delimited basally; rather narrowly rounded apically. Malar space short, as usual in the genus. Hypostomal costa slightly raised; genal costa meeting it a good quarter the way back to the foramen magnum.

Antennae with scape (Fig. 38) weakly convex dorsally, weakly excised externo-ventrally; with flagellum 31- to 36-segmented.

Pronotum with dorsal transverse furrow broad and shining; with epomiae strong; laterally shallowly and rather closely punctate above, generally strongly longitudinally rugose below. Propleura rather sparsely punctate, more closely so at sides. Mesoscutum rather strongly convex (some variation in this); with notaulices just indicated; rather shallowly but more or less coarsely punctate discally, more finely punctate behind. Scutellum not margined to middle; weakly convex and moderately to coarsely punctate above; smoother and falling rather abruptly behind. Mesopleura in upper half shining, moderately punctate in front, finely so around speculum; in lower half coarsely and closely punctate: sternaules more or less superficial: mesosternum and prepectus moderately and closely punctate: epicnemial carina scarcely elevated: mesolcus not strongly impressed; narrow in front, then broadening and sometimes transcarinate; generally well closed behind. Propodeum with costae mostly rather weak, but usually normally complete; for the most part weakly reticu-

late-rugose, but on area pleuralis shining and finely punctate in front; with posterior face generally less abruptly declived than in *amictorius* Panz. and *adspersus* Hart.: area superomedia strongly contracted from costulae to base and not basally delimited.

Gaster with tergites 1 and greater part of 2 rather strongly and closely reticulate-rugose, the sculpture somewhat weaker and diffuser towards apex of tergite 2; with tergite 3 in about basal half and at sides, and sometimes base of 4, closely reticulate, sometimes suggesting fine longitudinal rugosities; occasionally the reticulation is more extensive, but otherwise tergites 3 to 6 rather coarsely punctate, progressively more sparsely and shallowly so; with tergites 7 and 8 almost always finely and sparsely punctate. Petiolar segment 1·2 to 1·7, generally 1·4 to 1·5 times length of its greatest breadth; with dorsal keels of moderate strength and distinct for about three-quarters length of segment in female, rather stronger and almost percurrent in male. Apex of female gaster much as in *amictorius* Grav., but third valvulae perhaps on the average a little broader than in that species, and decidedly broader than as delineated by Cushman for that species (1940:3, fig. c): hypopygium not acute and not or scarcely folded in mid line: third valvulae not reaching apex of gaster.

Fore wings with basal and disco-cubital veins slightly divergent; with areolet sessile or shortly petiolate; with nervus parallelus emitted about in middle of brachial cell. Hind wings with nervellus opposite or slightly antefurcal, intercepted about in middle.

Tarsal claws with no more than a trace of pectination at base, not evident in male. Length 6 to 10 mm.

Head black, with the following parts deep, bright flavous: palpi, mandibles except at apex and, in male, often at base, clypeus except along suture and sometimes at apex, and lower face except for a median band. The yellow coloration extends on inner orbits at least a little way above antennal sockets; and also through malar space on to the genae, where it adjoins the mandibular base and extends a little way up outer orbits, but does not reach hypostomal costa nor approach genal costa. Antennae black, merging to ferrugineous above, dull fulvous below; with scape and sometimes pedicellus flavous-marked beneath. Thorax and propodeum black, with the following deep, bright flavous: greater part of scutellum and metascutellum; pair of roughly triangular marginal marks on mesoscutum covering notaulices, occasionally reflected on pronotum; median pair of marks on anterior margin of pronotum, often coalescing and extending towards lower angles; paired marks always below tegulae, often just above epicnemial carina, occasionally beside hind end of mesolcus, and occasionally by hind angle of area dentipara. Legs black, with the following deep, bright flavous, paler on hind leg: fore coxa extensively below and often round apex; mid coxae less extensively, sometimes only slightly below; trochanters and trochanterelli, except that those of hind leg are dark-marked; fore and, less extensively, mid femora in front and at apex; fore and mid tibiae and tarsi mainly; hind tibiae in about basal two-thirds except at extreme base; hind tarsal segments progressively more narrowly at base: hind coxae not pale marked. Wings with veins and stigma ferrugineous, basally paler. Gaster black, with the following bright flavous in female: rather broad apical bands, which often do not approach the sides, on first two tergites; and usually a series of much narrower apical bands on tergites 3 to 6: in male the

narrower bands may be developed on tergites 3 to 5 only; and in darkest forms even the band on tergite 2 is undeveloped.

Described from the following material: CZECHOSLOVAKIA, Kunzak, 1 ♀ (type) from cage, 18.x.1933, 1 ♀ em. 4.xii.1933, 1 ♀ em. 29.i.1934; Hradec, 9 ♂♂, 7 ♀♀ em. vi-vii.1936; Dobris, 1 ♂, 4 ♀♀ em. vi.1936; Plese, 2 ♂♂, 1 ♀ em. vi.1936; Allrestice, 3 ♀♀ em. vi.1936; Tyssa, 2 ♂♂; unlocalized, 7 ♂♂, 3 ♀♀; Riesengebirge, 1 ♀ (undated), Morris, Cameron, & Jepson: GERMANY, unlocalized (probably Germany), 2 ♂♂, O. Schmiedeknecht (mus. Geneva); Heilbrunn, 1 ♀, 8.vi.1888, J. Kriechbaumer; Bayerische Wald, Waldmünchen, 1 ♂, 9.vi.1948, 1 ♂, 1-8.ix.1948; Holstein, Trittau, Hahnheide, 1 ♀, 29.vi.1946, G. Heinrich: SWEDEN, Lapland, Torneträsk, R. Malaise (mus. Paris): FINLAND, Kuusamo, Liikasenvaara, 3 ♂♂, 1 ♀, 9.vii.1935; Mutkatunturi, 1 ♀, 31.vii.1935, G. J. K. All the above, except the type, have been designated paratypes.

Additional material seen: AUSTRIA, Styria, Admont, Kaiserau, 2 ♂♂, 2 ♀♀, 1-8.vii.1950, G. Heinrich. Recorded (under *claripennis* Thoms.) as established in Canada (Mason, 1951 April: 229).

Biology. The Czech material was reared by Morris, Cameron, & Jepson from *Gilpinia polytoma* Hart. with the exception of the specimen from the Riesengebirge which was from *Neodiprion sertifer* Geoffr.: these authors give considerable detail of their work (1937). The Finnish specimens were beaten from *Picea* on cool days.

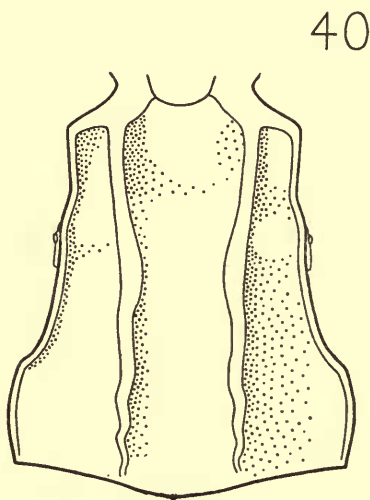
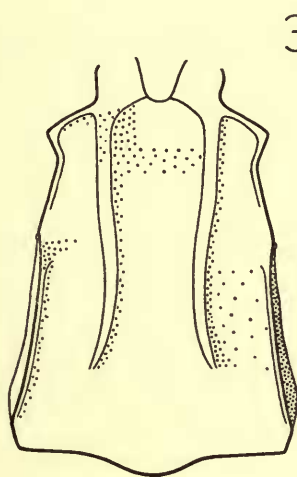
KEY TO EUROPEAN SPECIES OF *EXENTERUS* HARTIG

1. Petiolar segment trisinate (Fig. 40): hind tibia bearing a very minute spur: genal costa double, conformed much as in *Exyston genalis* Thoms. (Fig. 51): fore wings conspicuously clouded along fore margin *apiarius* Grav.
 Petiolar segment not thus trisinate (e.g. Fig. 39): hind tibia without a minute spur: genal costa not double: wings hyaline, or moderately and evenly infumate 2
2. Clypeus broadly rounded at apex and neither transversely impressed nor reflexed: antennae in female barely half as long as body, in male much shorter than body: gaster broad, with tergite 2 much broader at base than long (in female nearly twice as broad as long): claws in female usually pectinate. (*abruptorius* group) 3
 Clypeus more or less distinctly transversely impressed before the strongly rounded and reflexed apex: antennae in female much more than half as long as body, in male nearly as long as body: gaster generally narrow, with tergite 2 nearly or quite as long as basally broad: claws in female not or weakly pectinate (*amictorius* group) 5
3. Margin of cavities of fore coxae not raised, except weakly at sides: in side view, greatest length of head behind eye a little less than eye length: malar space almost equal to distance between mandibular apices: gaster in female more than half yellow: mesosternum conspicuously yellow-marked: yellow of first tergite extending far towards base laterally *oriolus* Hart.
 Margin of cavities of fore coxae raised: in side view, greatest length of head

behind eye a little more than eye length: malar space only about half distance between mandibular apices: gaster in female more than half, and mesosternum black: yellow of first tergite not or little wider laterally than medially . . . 4



FIGS. 34-38. Antennal scape, &c., in sinistral view, of Fig. 34. *Exenterus amictorius* Panz. Fig. 35. *Exenterus claripennis* Thoms. Fig. 36. *Exenterus adpersus* Hart. Fig. 37. *Exenterus vellicatus* Cushman. Fig. 38. *Exenterus confusus* sp. n.



FIGS. 39-40. Petiolar segment of Fig. 39. *Exenterus amictorius* Panz. ♀. Fig. 40. *Exenterus apiarius* Grav. ♀.

4. Margin of cavities of fore coxae not bidentate: claws in female pectinate: larger species, 8-11 mm. *abruptorius* Thunb.
 Margin of cavities of fore coxae strongly raised and strongly bidentate: claws simple: smaller species, 7 mm. *simplex* Thoms.
5. Gaster broad, as in *abruptorius* group, mainly chestnut-brown in colour, and with segments 1-2 strongly punctate but not rugose: costulae of propodeum absent, or weak and incomplete *ictericus* Grav.
 Gaster relatively narrow, as described before, black or black and yellow, and with

- segments 1-2 strongly rugose-punctate (except in smallest specimens of some species): costulae of propodeum distinct 6
6. Margin of cavities of fore coxae raised. 7
 Margin of cavities of fore coxae not raised, or only with traces of keels laterally 8
7. Margin of cavities of fore coxae bidentate, emarginate between the teeth and appearing discontinuous in middle: scape very weakly excised externo-ventrally (Fig. 34) *amictorius* Panz. (= *marginatorius* Fabr.)
 Margin of cavities of fore coxae not bidentate, appearing continuous and almost straight: scape rather weakly excised externo-ventrally (Fig. 35) *claripennis* Thoms.
8. Males: see discussion immediately following.
 Females 9
9. Gaster laterally beyond tergite 3, genitalia and hypopygium rufo-castaneous: hypopygium very acute (Cushman, 1940, fig. B), and without a distinct, broad stramineous or white hind margin: head moderately to strongly narrowed behind eyes, not as in female *adpersus* Hart. *tricolor* Roman
 Gaster not laterally rufo-castaneous: hypopygium not as above 10
10. Temple strongly convex, nearly as long as short diameter of eye: hypopygium sharply folded and moderately acute (Cushman, 1940, Fig. A): third valvulae very distinctly projecting beyond apex of tergites 7 and 8 (they project slightly beyond in *tricolor* Roman but not in other described European species)
 *adpersus* Hart.
 Not as above 11
11. Hypopygium pinched ventrally near apex, its lower margin in profile very strongly curved, its apex thin, wavy, broadly white (Cushman, 1940, fig. D): mesosternum and especially propodeum largely yellow-marked *vellicatus* Cush.
 Hypopygium not at all as above, not dissimilar from that of *amictorius* (*marginatorius*) (Cushman, 1940, fig. C), though ovipositor sheaths broader than as there represented: mesosternum and propodeum not largely yellow-marked *confusus* sp. n.

SEPARATION OF MALES OF FOUR SPECIES

Whereas the species *adpersus* Hart., *tricolor* Roman, *vellicatus* Cush., and *confusus* nov. are clearly distinguishable in the female sex upon the form of the hypopygium and third valvulae, and certain other features, such good external characters are not available for the separation of the males. Thus I find that in male *adpersus* the head may be shorter and distinctly narrowed behind the eyes; and some males that I believe to be *vellicatus* Cush. have the gaster laterally rufo-castaneous as in *tricolor* Roman. This condition should be distinguished from that obtaining in some small specimens of other species, in which the whole gaster, except the yellow-coloured parts, is dull castaneous rather than black.

Taking specimens and the description of *confusus* nov. as a starting-point, the

other species have been compared with these in both sexes. It is hoped that the resulting observations will enable the majority of specimens to be placed with confidence: the greatest difficulty appears to be the separation of males of *tricolor* Roman and *vellicatus* Cush.

E. adspersus Hart. differs from *confusus* as follows: lower face reticulate to some extent below antennae, but in greater part discretely punctate: clypeus finely to rather coarsely and rather sparsely punctate, on the average less strongly punctate than in *confusus*: scape somewhat strongly convex dorsally (Fig. 36): scutellum rather weakly to moderately convex, generally much more evenly so than in *confusus*, i.e. seldom falling at all abruptly behind: posterior face of propodeum more abruptly declived: propodeum more strongly, often quite strongly reticulate-rugose: yellow coloration of gena reaching hypostomal costa, and reaching or approaching genal costa: male mesoscutum more often, like that of female, with a pair of discal yellow marks between tegulae: propleura sometimes pale-marked: mid coxae and femora of male extensively pale-marked, as much so as on fore leg of *confusus*: hind coxae sometimes pale-marked beneath.

E. vellicatus Cush. is best compared with *adspersus*, with the colour differences of which from *confusus* it very much agrees, though the extent of genal coloration is often intermediate, as is the form of the scape (Fig. 37). Epistoma alutaceo-punctate, very little raised: notaulices a little more distinct than in *adspersus* or *tricolor*: sternaules more distinctly impressed: mesosternum decidedly flattened, with mesolcus more sharply impressed, scarcely broadening behind: area pleuralis of propodeum weakly rugose behind and below (quite strongly so in *adspersus*). The head is often distinctly raised behind the ocelli, but unfortunately this is not invariably so. In female a yellow mark runs along the sternaules, and in male there is usually a trace of this.

E. tricolor Roman differs from *vellicatus* as follows: scape weakly convex dorsally, as in *confusus*: epistoma not thus flattened, usually smooth between punctures: genal colour as in *adspersus* or intermediate, as in *vellicatus*: mesosternum and pleura as described for *adspersus*, but speculum extends farther forward and pleuron is more finely punctate in front of it.

Genus *EXYSTON* Schiødte

1839 *Exyston* Schiødte, *Guérin's Mag. Zool.* (2) 1: 12 (separate pagination).

1877 *Tricamptus* (Förster) Woldstedt, *Bull. Acad. Sci. St. Pétersbourg*, 23: 454.

Our knowledge of this genus in Europe has been in a most unsatisfactory condition. Unfortunately I have not examined the Gravenhorst types. The following specific names require consideration: *albicinctus* Grav., *albocinctus* Grav., *tricolor* Grav., *subnitidus* Grav., *cinctulus* Grav., *sponsorius* (Fabr. non Jurine) Grav., *carinatus* Thoms., *genalis* Thoms., *calcaratus* Thoms., *phaeorrhæus* Hal., *pratorum* Woldst. = *brevipetiolatus* Thoms. = *triangulatorius* Hlgr. non Grav. (*Anisoctenion*).

Of the above I am, in the present work, making *calcaratus* Thoms. the type of a new genus, *Parexyston*.

One of the two commonest European species has probably been sufficiently charac-

terized for its recognition, and has been best known as *brevipetiolatus* Thoms. Roman (1939) thought it to be *Cteniscus phaeorrhæus* Haliday but, as will be shown below, that conclusion is now disproved. Hellén (1937) placed it in synonymy with *pratorum* Woldst.; and there is not, to my knowledge, any valid prior name.

The second of the two most common species, which is very variable in colour, has the genal costa continuous or almost so; a fact first recognized by Thomson (1883), who took it to be the typical species and placed it under Gravenhorst's name *cinctulus*. The type of *cinctulus* Grav. 1820 is not to be found in the Turin museum (see Kerrich, 1950), so a lectotype should be selected from the Gravenhorst collection at Wrocław; but I accept the descriptions of 1820 and of 1829 as referring to this species, and I find no clear indication that any of the colour varieties described should refer to *genalis* Thoms. (see below). An intensive study of *cinctulus* Grav. confirms what had already been suspected, namely that the form described as *carinatus* Thoms. is within its limits of variation and is not specifically distinct.

Consideration must now be given to the name *sponsorius*. Pfankuch and Schmiedeknecht place *sponsorius* Grav. as a variety of *cinctulus*, but Gravenhorst attributed the name to Fabricius who would, of course, have priority. Dr. Kai Henriksen wrote to me that the type of *sponsorius* is not in the museum at Copenhagen. I am indebted to Kustos Dr. Olav Schröder for information from Kiel. It is not known whether Pfankuch ever examined the Fabrician collection there. No specimen labelled *Ichneumon sponsorius* is present. The type of *Cryptus sponsor* is present, labelled in Fabricius's own writing: it is a female with a distinctly exerted ovipositor, and may well have been correctly identified by later authors. There is also a specimen labelled by Fabricius '*sponsatorius*': on this the mid and hind tibiae each bear two spurs, so it can be no Cteniscine. It is a large species, about 15 mm. in length excluding appendages, and does not appear to agree with Fabricius's descriptions of *sponsorius*. It seems best to drop the name *sponsorius* unless or until another type can be discovered. *Exyston sponsorius* Grav. as identified by most later authors is a form of *cinctulus* Grav.; and I find no clear indication in Gravenhorst's descriptions that it could refer to any other species.

Thomson's diagnosis of *genalis* (1883: 883) was quite inadequate, and has failed to lead subsequent authors to its recognition. In his collection are three specimens, all female and all belonging to the species figured and redescribed as *genalis* in the present work. Unfortunately, no one of these can with assurance be selected as lectotype: one, however, is labelled 'coll. Ros.'; and since, as Dr. Kjell Ander informs me, Rosen-schiöld collected in Västergötland, this specimen could be the type. Thomson's words, 'Long. 3-3½ lin. *E. cinctulo* colore statura et magnitudine simillimus', corroborate this interpretation of the species. I was able to tell A. Roman that this was the species placed as *genalis* in the Lund collection; and his acceptance of this is evidenced by the series he arranged in the Swedish collection at Stockholm. He had known the species as a species, and he told me he had recognized it among Förster's material in the Vienna museum under the manuscript names *apicalis* (♀) and *aberrans* (♂); but he had been misled by Thomson's diagnosis. The species he recorded as *genalis* from Kamtchatka (Roman, 1931) is another, nearer related to *pratorum* Woldst. (see below).

Until 1946, *albocinctus* Grav. and *tricolor* Grav. were both unknown to me, and I wondered whether they would prove to be mere forms of the variable *cinctulus* Grav., as other authors had supposed. Pfankuch examined the types and amplified the descriptions (1906). Later (1925: 57), he recorded both forms from North Slesvig; though he wrote of *albocinctus* 'Wohl nur ein Varietät von *E. cinctulus*'. Schmiedeknecht (1912) mentioned no record of either subsequent to those of Gravenhorst (1829), though de Gaulle listed both in his catalogue (1908).

H. G. M. Teunissen sent me a list of the Cteniscine species known to him to occur in Holland, including *Exyston albocinctus* Grav. He most kindly responded to my request for the loan of this species by sending a Dutch male taken in 1887, and since recorded (Teunissen, 1948). Though only about $7\frac{1}{2}$ mm. in length and, in general, of rather paler coloration, this specimen agrees very well with the descriptions given by Gravenhorst and by Pfankuch. It is unquestionably a good species. The petiolar segment is, as stated by Gravenhorst, relatively less narrow than in *cinctulus*. I am pleased to acknowledge the credit due to Dr. Teunissen for the re-discovery of this species.

A small sending received shortly afterwards from R. Malaise contained another male of this species, bearing no determination label, and a female which I associated with it. Then I discovered that this female agrees very well with the descriptions of *tricolor* Grav. I have no hesitation in maintaining this association of the sexes, so *tricolor* Grav. falls in synonymy with *albocinctus* Grav. It may be objected that Gravenhorst recorded his specimen of *tricolor* as a male, and that Pfankuch did not disturb this interpretation; but 'vomeriform' third valvulae of a female Cteniscine are, when withdrawn, folded over, and they present an appearance very similar to that of a pair of male claspers. In such case the closest scrutiny is required to ensure correct sexing.

Specimens in de Gaulle's collection were unlabelled, but have now been rediscovered. Now that I know the species, I am satisfied that the description of *Ichneumon albicinctus* Grav. 1820 refers to it, though the type cannot be found in the Turin museum.

Cteniscus phaeorrhaeus Haliday was duly included by Morley, in the fourth volume of his monograph (1911: 207), under *Exenterus* (= *Exenterus* + *Cteniscus* as here accepted). When examining the Haliday collection in the Dublin museum two years later, Morley selected a lectotype, gave a brief description of it, and placed it next *Cteniscus mitigosus* Grav., but did not identify it with any species described elsewhere (1913: 261). At the same time he declared that the record given in his monograph was an error. Apart from a record by Haines (1931), the matter rested there until Roman (1939: 195), after correspondence with A. W. Stelfox, identified it with *Exyston brevipetiolatus* Thoms.

Upon my inquiring whether Roman's synonymy could be supported by fuller and more positive evidence than was contained in his rather brief note, Stelfox sent me Morley's lectotype for examination, and wrote that in his opinion it could not be the type, and that Roman had agreed with this. It is a female but, in other respects, fits Morley's diagnosis. It runs down in Schmiedeknecht's key to *Cteniscus dorsator* Thunb. (= *limbatus* Hlgr.), and fits the description of that form. It must be rejected

as type of *phaeorrhaeus* Hal. since, as indeed is stated by Morley, the fore legs are not basally black, and the gaster is not fulvous at the apex but red discally and bright flavous banded near the apex. More than one twentieth-century specialist of repute has mistaken a female for a male Cteniscine, yet Haliday recorded both sexes of *Ct. aurifluus* and may be presumed to have distinguished them, especially as, so Stelfox tells me, he often dissected specimens when describing species. Furthermore, another female specimen of *dorsator* Thunb. in the collection bears the label '*cephalotes*' in Haliday's writing.

A. W. Stelfox has now given me the following fuller account of his correspondence with A. Roman. He sent a description and figure of Morley's lectotype, which Roman identified as *dorsator* Thunb. He had failed to find in Haliday's collection a specimen which could, in his opinion, be the type, so he sent from his own collection a male specimen of a species he had taken frequently in Ireland, had not identified with any other author's description, but thought most likely to be Haliday's *phaeorrhaeus*. Roman identified it with *brevipetiolatus* Thoms., and agreed with the conclusion. I have now seen the actual specimen and agree with the identification.

Indeed, the conclusion appeared highly probable. The species agrees with Haliday's description in the male sex diagnosed. It is of interest that the specimen recorded as *Exenterus phaeorrhaeus* from Woodstreet by Haines in his Hants & Dorset list (1931) does belong to *brevipetiolatus* Thoms. Haines used Morley's monograph, and the diagnosis there published, which Morley later (1913) declared to have been an error, seemed to me to refer to the same species. Mr. Morley kindly sent me the specimen on loan, which enabled me to confirm this supposition, and to see from a second label that he had placed the specimen correctly, later in 1911.

On first glancing at the box from the part of the Haliday collection relevant to the present study containing, among other Tryphoninae, the Cteniscini, I looked for *brevipetiolatus* Thoms. and caught sight of what I took to be a large dark male. Upon closer examination, I was astonished to find it was a male of a species I had received from Czechoslovakia from Professor Gregor, and which I had believed to be undescribed. This specimen I designate the type. The pinhead bears green sealing-wax: Haliday's mode of indicating an Irish insect. I have examined every Cteniscine in that box from which *brevipetiolatus* is absent and, in my view, no other specimen could possibly serve as type. Moreover, it fits Haliday's diagnosis even better than does *brevipetiolatus*: the fore and mid femora, except internally, and also the trochanters are distinctly ferrugineous, and the coxae are black or almost so. The hinder part of the gaster is much more outstandingly fulvous: in this respect the specific name may be taken as indirect supporting evidence, for '*phae-orrhaeus*', as I am told by classical scholars at the University of Manchester, means 'bright-coloured rump'.

Finally it may be noted that Morley (1911) provided a false clue by misinterpreting Haliday's manuscript catalogue, in which there stands against *phaeorrhaeus* the mark for 'certainly Irish' but not the mark indicating 'common or in many collections'.

Tryphon subnitidus Grav. was placed in *Exyston* by Pfankuch (1906). Schmiedeknecht (1911), being unable to place the species, omitted mention of it; but Morley (1911) recorded it as British from an old specimen in the British Museum. This

proves to be a small, dark male *Anisoctenion rubiginosus* Grav., as is a specimen so placed in the Melville-Bury collection, now in the Manchester Museum. C. Morley very kindly sent me on loan two specimens from the series taken by him in Suffolk in 1919 and recorded as *subnitidus* (1936), but these agree with my description of *Parexyston calcaratus* Thoms.

In 1949, when sorting specimens for the redescription of *phaeorrhæus* Hal., I found that a second, closely related, species was mixed with them, represented by three specimens from Switzerland and one from Spain. At last a species had been discovered whose male I could reconcile with Gravenhorst's description and Pfankuch's diagnosis of *subnitidus*.

Exyston cinctulus Gravenhorst

1820 *Ichneumon cinctulus* Gravenhorst, *Mem. Accad. Sci. Torino*, **24**: 359-361.

1820 *Ichneumon sponsorius* Gravenhorst, *ibid.*: 362.

1829 *Mesoleptus cinctulus* Gravenhorst, *Ichneumonologia Europaea*, **2**: 37-41.

1839 *Exyston cinctulus* Schiødte, *Guérin's Mag. Zool.* (2) **1**: 12 (separate pagination).

1883 *Exyston cinctulus* Thomson, *Opuscula Entomologica*, fasc. 9: 882.

1883 *Exyston carinatus* Thomson, *ibid.*: 882-883.

1906 *Exyston cinctulus* Pfankuch, *Z. Hym. Dipt.* **6**: 21.

Head moderately to rather strongly narrowed behind eyes and strongly rounded; moderately emarginate behind: on inner orbits finely, on vertex and temples finely to moderately punctate, and on genae more coarsely so: epistoma more or less coarsely reticulate or rugose-punctate, occasionally in small specimens discretely punctate: upper face generally with a distinct median keel, reticulate-punctate to rugose. Clypeus normally not strongly transverse; rather sparsely beset with punctures of different sizes, fine to coarse; sharply delimited basally; narrowly to broadly rounded at apex. Malar space about equal to distance between mandibular apices in male, distinctly longer in female. Hypostomal costa strongly raised, the elevation extending well back towards foramen magnum: genal costa continuous (Fig. 50); strongly raised in female, less strongly so in male. A weak costa is generally developed, running outward from the hypostomal costa toward the genal; but this may be broken up into a series of transverse rugae.

Antennae with scape deeply excised externo-ventrally (Fig. 53); with postannellus about 1.9 times length of the following segment; with flagellum 28- to 37-, usually 32- to 34-segmented.

Pronotum with epomiae sharp and generally fairly strong; laterally rather finely to moderately, occasionally quite finely punctate above, finely punctate to rugose below. Propleura rather finely to moderately punctate. Mesoscutum rather weakly to strongly and evenly convex; with notaulices always indicated but extremely superficial; rather finely punctate medially, finely to very finely so laterally. Scutellum rather weakly to rather strongly convex; margined to near middle; rather coarsely punctate or rugose-punctate in front, finely reticulate-rugose behind. Mesopleura rather coarsely punctate in greater part, generally rather finely so on region of speculum: sternaules of moderate strength, rather sharply impressed: mesosternum closely and finely punctate: epicnemial carina strongly raised in female, moderately

or rather strongly so in male; undeveloped above sternaules, medially emarginate; mesolcus moderately impressed, generally transcostate in male, closed behind. Propodeum with costae weak but normally complete; finely to moderately punctate and shining above, merging to rugose, especially on spiracular and posteromedial areas, but with area pleuralis usually discretely punctate: area superomedia usually distinctly longer than broad but sometimes subquadrate.

Gaster much more spindle-shaped than clavate. Petiolar segment generally elongate and slender, of female 2.2 to 3.0, usually 2.5 to 2.8, of male 1.8 to 3.0, usually 2.2 to 2.6, times length of its greatest breadth; bearing lateral hairs distinctly longer than half its least breadth; generally moderately to strongly auriculate basally, but occasionally rather weakly so; with dorsal keels usually not sharp, distinct for half to more than four-fifths length of segment; rather finely to moderately punctate above, often in part rugose-punctate. Sculpture of remaining tergites as described for *genalis* Thoms. (p. 376 below). Female third valvulae not vomeriform.

Fore wings with basal and disco-cubital veins convergent; with areolet shortly petiolate; with nervus parallelus emitted in middle of brachial cell. Hind wings with nervellus almost opposite, usually intercepted well above middle.

Hind femur varying considerably in proportion (Figs. 41-42), from 4.5 to 5.2 times length of its greatest breadth in Irish specimens alone. Tarsal claws not pectinate.

Length 6 to 11 mm.

Female. Head coloured as in *genalis* Thoms., but the yellow coloration less extensive behind eyes, the black not more remote from lower mandibular articulation than about length of malar space. Antennae coloured as in *genalis*; but with scape and pedicellus often dull ferrugineous marginally and below, and only the membrane conspicuously pale. Thorax coloured as in female *genalis*; but the yellow coloration generally a little less extensive around epicnemial carina and on pronotum, sometimes much more restricted on or even absent from those parts and beneath wing-base. Legs with the following bright flavous: hind coxae largely below, fore and mid coxae except at base, and trochanters and trochanterelli; the hind and sometimes the mid trochanters above and the hind trochanterelli are dark-marked; the coxae are otherwise black or infuscate, or in brighter colour-forms partly rufous: femora, tibiae and tarsi fulvous to rufous; with femora flavous at apex and hind tibiae conspicuously stramineous at base; with the following parts infuscate: fore and mid tarsi at apex and hind tarsi largely, hind tibiae at apex and before base, hind femora at base and before apex, and sometimes fore and mid femora slightly before base. Wings with stigma and costa ochreous and the other veins ferrugineous, more or less yellow at base.

Colour pattern of gaster essentially of the type described for *genalis*, but more diverse and irregular: frequently there is no infuscation on tergites 2-4, and in brightest females the petiolar segment is rufous, only a little infuscate in basal half: in darkest females the rufous and yellow colouring is rather indefinitely suffused with infuscation, but in darkest males the tergites are black or infuscate from base, the infuscation so spreading as to reduce the rufous colouring to a narrow region before the pale yellow part.

Male. Head coloured as in male *genalis* Thoms., or the pale coloration further

reduced in varying degree: in extreme case the black invades the clypeus, and the facial pale marks are reduced to narrow orbital lines running to the upper mandibular articulation; but commonly the orbital marks broadened above the tentorial pits, and a central mark remaining on the epistoma. Thorax black; normally with tegulae wholly pale and scutellum conspicuously pale-marked at apex, and sometimes with metascutellum more or less obscurely pale-marked; but sometimes the tegulae are partly infusate, and in darkest colour-forms the scutellar mark is absent or greatly reduced. Coxae on the average more infusate: in brightest forms the hind coxae are yet broadly flavous below; but in darkest the fore and mid coxae are only a little pale at apex and the hind coxae not at all pale, and the rufous colouring of the hind femora and tibiae is largely replaced by infuscation.

Redescribed from the following material: IRELAND, S. Kerry, Coumloughra Reeks, 1 ♂, Darrynane, 1 ♀, Westmeath, Lough Owel, 1 ♂, Wicklow, Glenmacnass, 1 ♂, 1 ♀, Greystones, 1 ♀, Coan, 3 ♂♂, Kings River, 1 ♂, Co. Dublin, Glenasmole, 1 ♂, 1 ♀, 8.vi-15.vii, 1928-1937, A. W. Stelfox *et al.*: SCOTLAND, Ross-shire, Loch Duich, 1 ♂, 29.vi.1934, O. W. Richards: ENGLAND, unlocalized, 3 ♂♂, Stephens coll., 1 ♂, 1 ♀, Desvignes coll., 1 ♀, 1929-1930, F. S. J. Hollick; Devon, Lustleigh, 1 ♂, 7.vi.1933, R. C. L. Perkins; Monmouth, Trelleck Beacons, 1 ♂, 10.vi.1936, E. B. Britton & J. F. Perkins: BELGIUM, unlocalized, 11 ♂♂, 6 ♀♀, Cortenaeken, 1 ♂, C. Wesmael; Steenbrugge, 1 ♂, 24.v.1875, Vivier d'Oie, 1 ♂, 29.v.1886, St. Croix, 1 ♂, 22.viii.1871, Ath, 1 ♀, 19.viii.1876, Severin, 1 ♀, 10.viii.1899, J. Tosquinet: HOLLAND, Venlo, 1 ♂, 19.vi, 1 ♀, 20.vi.1942, H. G. M. Teunissen: SWEDEN, Skåne, Degaberga, 2 ♂♂, 3 ♀♀, 9-12.vii.1938, D. M. S. & J. F. Perkins: FRANCE, Central Massif, la Bourboule, 1 ♂, J. de Gaulle: SWITZERLAND, Geneva, Peney, 1 ♂, 4 ♀♀, 20.v.-10.vi, 1876-1889, 1 ♂, 20.viii.1889, Tournier; Champel, 1 ♂, 25.iv, 1 ♂, 18.vi, Buess; Valais, les Haudères, 1 ♂, 6-27.vi.1935, R. B. Benson; Engadine National Park, 2 ♂♂, 5 ♀♀, 6.vii-6.viii, 1919-1923, Ch. Ferrière: GERMANY, Berlin dist., 1 ♂, 3 ♀♀, Ruthe coll.; Bavaria, 1 ♂, 3 ♀♀, 7.vi, 1 ♀, 8.vi, 1 ♂, 15.vi, 1 ♀, 25.viii, 1 ♂ without data, Buchecker coll.; Erzgebirge, Görkau, 3 ♀♀, vii.1932, Th. Kupka; Schwerin, 1 ♀, 11.vi.1880, 1 ♂, 30.v.1884, S. Brauns; Celle, 1 ♂, 21.vi.1942, R. Hinz: CZECHOSLOVAKIA, Bohumin, 1 ♀, viii.1937, Th. Kupka: RUMANIA, 2 ♂♂, 1 ♀, M. Jaquet.

Further material seen: FINLAND, Tenala, 2 ♂♂, v. Essen; Jääski, 1 ♀, K. Valle; Taipalsaari, 1 ♂, W. Hellén: SWEDEN, good series from many parts in Stockholm museum; material under *cinctulus* and *carinatus* in Lund museum: GERMANY, Upper Bavaria, Berchtesgaden, 1 ♂, 30.v, 1 ♂, 30.vi, 1 ♀, 20.vi.1947, G. Heinrich: FRANCE, Maisons Laffitte, Fontenay, la Bourboule, &c., J. de Gaulle; Brout-Vernet, H. de Buysson; Haut-Rhin, Alpes Maritimes, A. Seyrig (altogether 24 specimens in Paris museum): AUSTRIA, Styria, Admont, Kaiserau, 1,200 m., 1 ♀, vi.1950, G. Heinrich: 60 further specimens in British Museum (Natural History).

An inordinately variable species. To decide whether it was a single species, the method adopted was to write a description first from the Irish material, which could be assumed to be conspecific; and then to modify this by reference to more than seventy other specimens, which was as diverse a collection as could be assembled.

VARIATIONAL TENDENCIES

A dark form is found in Ireland, the west of England and Scotland, and the high Alps. This tends to have the clypeus rather broadly rounded at apex. An intermediate has been studied from southern Sweden, Degaberga, having the same data as the normal form; and also from La Bourboule, French Central Massif.

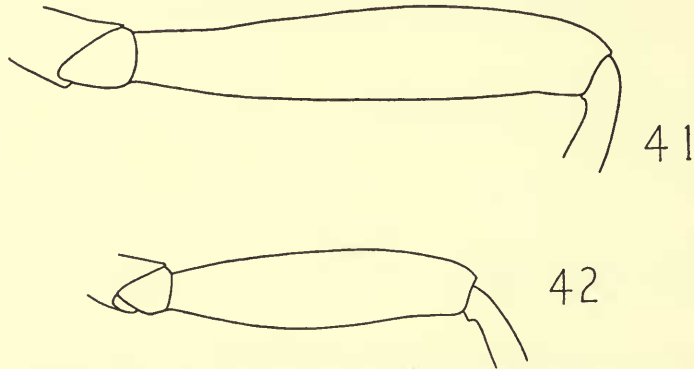
A brighter, stouter form is found in Holland, Belgium, Switzerland, and Bavaria. This has the head rather less narrowed behind the eyes, and the petiolar segment relatively less elongate.

Small specimens of the species tend to have the clypeus more transverse and the malar space a little shorter.

***Exyston cinctulus* Grav. ab. *approximatus*, ab. n.**

Differs from the normal form of *cinctulus* in having genal costa approaching rather close to mandibular base but thereafter inflected (Fig. 49).

RUSSIA: Samara (on R. Volga), 1 ♀, viii.1924, Lubischew (collection of A. Seyrig). Holotype in Museum d'Histoire Naturelle, Paris.



FIGS. 41-42. Left hind femur, in outer side view, of *Exyston cinctulus* Grav. These illustrate the great intraspecific variation, and it is instructive to compare them with Figs. 16-17 (p. 327) of two species of *Anisoctenion*, where a good inter-specific difference is indicated. Fig. 41 is drawn from a female specimen from Czechoslovakia, and Fig. 42 from the type of ab. *approximatus* n. from Russia.

A second specimen has since been definitely attributed to this aberration: FINLAND, Tammerfors, C. Lundahl: this is a fine female specimen of 11 mm. length.

At first this was thought to be a good species, closely related to *cinctulus* Grav. but having secondary differences correlated with the primary character. When, however, *cinctulus* was studied intensively from a series of over eighty specimens, as diverse as could be obtained, it was found that the supposed differences of the Russian specimen were within or but little outside the great range of variation in *cinctulus* to the west of Russia.

Other specimens were found, with the genal costa inflected but the intervening space narrower. Yet other specimens have a mere trace of an inflected genal costa; and one particularly instructive specimen (in British Museum) has the genal costa

split into an outer branch running almost normally as in Fig. 50 and an inner branch inflected in the manner of the aberration. It appears that in the normal form the genal costa, though having the condition described as continuous, continues towards the hypostomal costa as a lamina contiguous with the genal margin backing the mandibular articulation.

Exyston cinctulus Grav. subsp. **clavatus** Cresson

1864 *Cteniscus clavatus* Cresson, *Proc. Ent. Soc. Philadelphia*, **3**: 284.

1897 *Exyston clavatus* Davis, *Trans. Amer. ent. Soc.* **24**: 238.

1944 *Exyston clavatus* Townes, *Mem. Amer. ent. Soc.* **11** (1): 167-168.

Altogether less strongly hairy than the European form: genal costa not so strongly elevated or hairy: yellow coloration more extensive behind eyes: antennal scapes largely dull fulvous, with a yellowish spot beneath: flagellum also dull fulvous above in apical half: thorax more richly yellow-marked: propodeum decidedly tending to dull rufous (among European material I have only seen this in a few old specimens which may have suffered fading): coxae darkened to rufous only, not at all black: petiolar segment scarcely infuscate at base, but there is some infuscation on other tergites, particularly 3 and 4.

Diagnosis based on 1 ♀, Iosco Co., Michigan, 16-17.vii.1939, R. R. Dreisbach; det. H. K. Townes.

W. R. M. Mason kindly informs me that *clavatus* is very much less variable than the European form: also that it is evidently not an introduced species, for it is known from remote parts of northern Ontario; yet it is geographically isolated, being unknown west of the Rocky Mountains. These facts strengthen my belief that it is a true geographical sub-species.

He has since written that he agrees with my treatment of *clavatus*, and has sent me a further two females and a male for study. These substantially confirm the above diagnosis; but the male has the hind coxae and petiolar segment pale castaneous except at apex. He has recorded this new synonymy in the North American catalogue (1951 April: 229).

Exyston genalis Thomson

1883 *Exyston genalis* Thomson, *Opuscula Entomologica*, fasc. 9: 883 (non Roman 1931, nec Teunissen 1948).

Head rather strongly to strongly narrowed behind eyes; moderately emarginate behind: on vertex, temples and inner orbits rather finely to moderately punctate; on genae more coarsely, irregularly and in part confluent so: epistoma coarsely reticulate-punctate: upper face with a distinct median keel, moderately punctate, more or less rugose on triangle between median ocellus and antennal sockets. Clypeus rather strongly transverse, distinctly more so than in *cinctulus* Grav.; rather sparsely beset with punctures of different sizes, fine to coarse; rather deeply delimited basally; more or less narrowly rounded at apex. Malar space about equal to distance between mandibular apices in female, distinctly less in male. Hypostomal costa strongly raised, the elevation falling gradually to the foramen magnum. Genal costa strongly

raised, double (Fig. 51): the outer costa almost continuous, the inner strongly inflected, meeting the hypostomal costa at the point where the latter is most strongly raised; the intervening space traversed by a series of ridges: outer and inner costae crenulate; usually both are upstanding in the female; but sometimes in that sex, and usually to a greater extent in the male, the inner costa is bent outward, so that the intervening space is in varying degree narrowed.

Antennae with scape weakly excised externo-ventrally (Fig. 54); with postannellus about 1.8 times length of the following segment; with flagellum 31- to 37-segmented.

Pronotum with epomiae of moderate strength; laterally moderately punctate above, finely punctate to rugose below. Propleura moderately, or rather finely and closely punctate. Mesoscutum strongly and almost evenly convex; with notaulices very superficial and not clear-cut; more or less finely punctate medially, very finely punctate and shining laterally. Scutellum moderately convex; rather finely to moderately and often rather closely punctate (in the specimen from the Tatra Mts. largely rugose); not margined to middle. Mesopleura moderately punctate, in part rugose-punctate, in front; more finely punctate behind: sternauleses quite distinctly, though seldom strongly, impressed: mesosternum densely and very finely punctate: epicnemial carina strongly raised, indistinct above sternauleses, medially emarginate but not nearly interrupted: mesolcus very sharply impressed, partly closed behind. The male differs in having the epicnemial carina only moderately raised, and the mesolcus more or less distinctly transcostate, not sharply impressed. Propodeum with costae rather weak but normally complete, though area basalis sometimes incompletely delimited apically; with area pleuralis finely and closely punctate; elsewhere more or less finely rugose.

Gaster distinctly clavate. Petiolar segment elongate and slender, 2.5 to 3.1 times length of its greatest breadth near apex; bearing lateral hairs distinctly longer than half its least breadth; weakly or moderately auriculate basally; with dorsal keels rather sharp, distinct for quite three-quarters length of segment; almost smooth between the keels, finely punctate and obsoletely rugose beside and behind them. Tergite 2 distinctly raised on mid line at base, and impressed to either side of this elevation; rather finely to moderately punctate and often rugulose on basal half. Remainder of gaster more and more finely punctate. Female third valvulae small, vomeriform.

Fore wings with basal and disco-cubital veins strongly convergent; with areolet usually shortly petiolate but sometimes sub-sessile or sessile; with nervus parallelus emitted in middle of brachial cell. Hind wings with nervellus almost opposite, intercepted a little above middle.

Hind femur 4.1 to 5.2 times length of its greatest breadth. Tarsal claws not pectinate.

Length 6 to 10 mm.

Female. Head black above a line running roughly transversely around, just below antennal sockets and foramen magnum; below this line stramineous to flavous, the pale coloration also extending some way up orbits of upper face: mandibles concolorous except at apex. Antennae with scape, pedicellus and postannellus mainly black, the scape almost always conspicuously pale-marked below: with annellus cas-

taneous; beyond postannellus changing to ferrugineous above, dull fulvous below. Thorax black, with the following parts pale-coloured as on head: propleura mainly, ventral margins of pronotum at sides (the marks sometimes interrupted), region of epicnemial carina with backward extensions on sternaulices and beside mesolcus, small marks below wing-base, tegulae, mark at apex of scutellum and usually another on metascutellum. Legs rufous; with trochanters and trochanterelli, fore and mid coxae mainly, and hind coxae nearly always below, bright flavous; with knees rather indefinitely pale flavous; with the following parts infusate: hind tarsi, hind tibiae at apex and before base, and hind femora before apex and at base: hind coxae generally in greater part black and usually rufous-marked, but sometimes in greater part rufous. Wings with veins and stigma pale ferrugineous, more or less yellow at base. Petiolar segment back, with a small pale mark at mid apex. Remainder of gaster normally mainly rufous; with tergite 2 black at base and sides, and with lateral black marks at base of tergites 3 and 4; with tergites having ill-defined but successively broader pale yellow apical margins, which occupy most of tergites 6 and 7: the yellow coloration may be more extensive, or the pale parts of the tergites may be to a greater or lesser extent overspread with infuscation.

Male differs as follows. Black coloration more extensive, reaching behind eye to a line between eye and lower articulation of mandible; often developed at mid base of mandible, along clypeo-frontal suture, and extending farther on to epistoma: orbits of upper face not pale. Scape with pale mark smaller or almost undeveloped. Thorax black, with tegulae usually wholly or partly pale, but without other pale marks. Fore and mid coxae to a large extent black or blackish at base: hind coxae almost entirely black. Yellow margins of tergites narrower and often more sharply defined: in one specimen from Bavaria tergites 2 to 6 mainly black above, with just a trace of rufous colouring on 3 and 4.

The male specimen from the French Ardennes has much of the female structure and coloration. This species is illustrated on Pl. 5.

Redescribed from the following material: NORWAY, Sognsvatnet, Aker, 1 ♀, 31.vii.1935, T. Soot-Ryen (mus. Stockholm, recorded as *E. sp. ign.* by Roman, 1942: 14); SWEDEN, Dalarne, 1 ♂, 16.vii, A. Roman; Dalarne, Orsa W., 1 ♀, 5.viii.1938, G. J. K.: FINLAND, Keuru, 1 ♂, J. Sahlberg; Karislojo, 2 ♂♂, 11.vi.1934, R. Krogerus; Ruovesi, 1 ♂, 26.vi.1931, V. Saarinen; Tampere, Aitolahti, 1 ♂, 26.vi, 1 ♀ 28.vi.1933, A. Saarinen; Kuusamo, 1 ♂, 6.vii. 1935, R. Krogerus; Kuusamo, Ruskeakallio, 1 ♂, 17.vii.1935, R. Krogerus, 1 ♀, 26.vii.1935, G. J. K.: SWITZERLAND, Nyon, 1 ♀, Cheyr: FRANCE, Ardennes, Verdun, 1 ♂, 10.viii.1925, Benoist: BELGIUM, Severin, 1 ♂, 22.vi. 1899, Bastogne, 1 ♂, 23.viii.1887, J. Tosquinet: GERMANY, Schwerin, 1 ♀, viii.1887, S. Brauns (Nat. Mus. Ireland); Köln, 1 ♀, vii.1945, Aerts; Goslar, 1 ♀, 21.viii.1945, Celle, 1 ♀, 26.vii.1942, R. Hinz; Berlin dist., 1 ♂, Ruthe coll.; Oderberg-Liepe, 1 ♀, 19.viii.1938, G. J. K.; Bavaria, Erzgebirge, Görkau, 1 ♀, 11.vi.1932, Th. Kupka: MIDDLE EUROPE (unlocalized), 1 ♀, 4.vii.1900, R. von Stein coll.: CZECHOSLOVAKIA, Bohemia, Chodau, 1 ♂, 10.vi.1878, R. von Stein coll.; Erzgebirge, Aussig, 1 ♀, 11.vi. 1932, Th. Kupka: POLAND, Tatra Mts., Zakopane, 1 ♂, 28.vi.1932, D. Aubertin & E. Trewavas.

Additional material seen: ITALY, Liguria, 1 ♀ in Spinola coll. in Turin museum:

GERMANY, Bodmann am Bodensee, 1 ♂, 25.v., 1 ♂, 18.vi.1949; Bildhausen, Krs Kissingen, 1 ♂, 15.viii, 1 ♀, 22.viii.1946; Holstein, Trittau, 1 ♂, 3.vii.1946, G. Heinrich: HOLLAND, Hulshorst, 1 ♂, 26.vi.1935, Lindemans: SWEDEN, Stockholm mus. coll., good series from wide range of latitudes; Thomson coll., 1 ♀, unlocalized, Rosenschöld (possibly the type); 1 ♀, province Närke; also 1 ♀ 'Finl.' (presumably from Finland).

Since the above was written, I have seen the series of 30 ♂♂, 12 ♀♀ taken in Styria, Austria, by G. Heinrich in June–July 1950. These confirm the characters used in my two keys to species of the genus.

Exyston phaeorrhaeus Haliday

1838 *Tryphon* (subgenus *Cteniscus*) *phaeorrhaeus* Haliday, *Ann. Mag. nat. Hist.* (1) 2: 113 (non Morley 1911, nec Morley 1913, nec Roman 1939).

Head rounded and strongly narrowed behind eyes; moderately emarginate behind: between ocelli and eyes rather coarsely and sparsely punctate; before occiput very finely punctate above; on temples and cheeks for the most part moderately punctate; on inner orbits more densely so, and on malar space more finely and much more densely punctate: epistoma reticulate-punctate to rugose: upper face in middle more or less trans-rugose, with a median keel that is often distinctly bifurcate before median ocellus. Clypeus smooth in contrast with the epistoma; sparsely beset with punctures of different sizes, fine to coarse; rather deeply delimited basally; weakly convex; rather narrowly to rather broadly rounded apically. Malar space at least four-fifths distance between mandibular apices, the gena distinctly angularly raised before mandibular articulation. Genal costa (Fig. 52) laminate, running forward to a point, then deeply emarginate before it again runs forward to meet the hypostomal costa, which is raised to a sharp point well forward. Outer genal costa bulging strongly outward, seen in frontal view as in Fig. 43, the bulge forming a very distinct angle with the normal plane of the gena. Between inner and outer costae is a cavity, traversed by a costa running outward from below point of inner genal costa, and usually a weaker one dorsal to this (below it in Fig. 52). The keel that, in this view, descends from the point of the hypostomal costa runs close behind the lower articulation of the mandible and appears almost to close the cavity in front.

Antennae with scape strongly excised externally (Fig. 56); with pedicellus strongly rounded internally, as seen from above; with postannellus about 1.5 times length of following segment; with flagellum 25- to 28-segmented.

Pronotum with distinct shining dorsal furrow; with epomiae rather strong and sharp; laterally finely punctate above, more or less longitudinally rugose below. Propleura smooth and very finely punctate. Mesoscutum very strongly convex though somewhat flattened discally; with notaulices very weak but distinct, extending almost as far back as hind end of tegulae; finely punctate between notaulices, sparsely and very finely punctate at sides. Scutellum rather weakly to rather strongly convex; not margined to middle; rather finely to moderately punctate, densely so behind. Mesopleura with longitudinal rugosities just behind those on pronotum; otherwise moderately punctate below, sparsely and finely so above: sternaulices

shallow, punctate or rugose-punctate: mesosternum finely punctate, near mid line rather closely, laterally rather sparsely so: mesolcus moderately deeply impressed, broad and transcostate, closed behind: epicnemial carina strongly raised near mid line, medially deeply incised, thus bilobed; laterally moderately raised, disappearing just above lower angle of pronotum.

Propodeum with costae strong; with areae externa, basalis and superomedia shining and very finely punctate; with area pleuralis often mainly reticulate-rugose, and with other areae rather strongly rugose: area basalis generally delimited apically, falling sharply forward between strongly raised keels: area posteromedia elongate, extending forward far beyond middle.

Gaster strongly clavate. Petiolar segment 2.0 to 2.4 times length of its greatest breadth; moderately auriculate basally; with dorsal keels distinct, sometimes to near apex; sharply raised from margins to keels, flattened, sometimes slightly concave, between the keels; rather obscurely punctate medially near apex, elsewhere obscurely rugose. Tergites 2 to beyond middle and 3 at base closely beset with punctures of moderate strength on an alutaceous background, the interspaces tending to form longitudinal rugulosity: tergite 2 appreciably raised medially at base: thyridia sharply outlined and conspicuous, almost semicircular. Remainder of gaster normally finely punctate. Female third valvulae small, vomeriform.

Fore wings with basal and disco-cubital veins convergent, generally very slightly so; with areolet varying from distinctly petiolate (as in type) to sessile; with nervus parallelus emitted about in middle of brachial cell. Hind wings with nervellus slightly antefurcal, intercepted about in middle.

Tarsal claws with such stout hairs as to suggest pectination.

Length $5\frac{1}{2}$ to 7 mm.

Female. Head black, with the following parts dull yellowish-ivory: palpi, mandibles except at apex and medially at base, clypeus, lower face except for a transverse line below antennal sockets, and genae largely. Antennae dull fulvous to ochreous beneath, with a few basal segments mainly black; more extensively black above, and becoming paler more gradually towards apex; with scape at apex above, annellus and extreme base of post-annellus castaneous. Thorax black, with scutellum at apex, propleura, and usually the lower angle of pronotum, yellowish-ivory; with tegulae sometimes pale castaneous behind. Legs mainly castaneous to black, with trochanters and femora pale at extreme apex: fore and mid legs with coxae and trochanters mainly yellowish-ivory anteriorly and femora and tibiae mainly flavous anteriorly. Wings with veins and stigma ferrugineous, basally paler. Gaster with petiolar segment black; with tergites 2 to 4 dull castaneous to black, with pale apical margins, and usually largely fulvo-castaneous at sides; with tergites 5 or 6 and following much paler, generally bright flavous: sternal region flavous to fulvous.

Male differs as follows. Head black, with palpi dull fulvous; with mandibles pale-coloured across middle: clypeus black at sides and more or less broadly inside suture, otherwise ivory-white, except that in type it is broadly fulvo-castaneous at apex. Thorax without any pale marks. Legs coloured as in female, but the coxae and trochanters are not pale except at extreme apex.

Redescribed from the following material: IRELAND, unlocalized, type ♂, A. H.

Haliday: ENGLAND, unlocalized, 1 ♂, 1907; Devon, Dartmoor, 3 ♂♂, 22.vi.1935, Lydford, 1 ♀, 20.vi.1944, R. C. L. Perkins: HOLLAND, Den Dungen, 1 ♂, 15.v.1942, H. G. M. Teunissen (Teunissen, 1948, under *E. genalis* Thoms.): SWITZERLAND, Geneva, Peney, 3 ♀♀, 28.v.1884, 1 ♀, 1886, 1 ♀, 5.vi.1889, Tournier; Champel, 1 ♀, coll. Buess; CZECHOSLOVAKIA, Moravia, Brno Hádý, 1 ♀, 13.vi.1936, A. Hoffer.

Further material seen: FRANCE, Paris district, St. Michel, O. Sichel; Haut-Rhin, 30.v.1920, A. Seyrig (4 specimens in mus. Paris): GERMANY, Schleswig, Kiel, 1 ♂, 22.v.1949, G. Heinrich: AUSTRIA, Styria, Admont district, 1,200 m., on *Alnus incana*, 1 ♀, 25.vi.1950, G. Heinrich: TURKEY-in-Europe, Istanbul, 1 ♂, coll. de Gaulle; this is a peculiar specimen, with the spiracular tubercles of the petiolar segment sharp and very prominent.

Exyston subnitidus Gravenhorst

1829 *Tryphon subnitidus* Gravenhorst, *Ichneumonologia Europaea*, 2: 144-145 (non Morley 1911, nec Morley 1936).

1906 *Exyston subnitidus* Pfankuch, *Z. Hym. Dipt.* 6: 90.

This species is closely related to, but much less strongly hairy than, *phaeorrhæus* Hal.

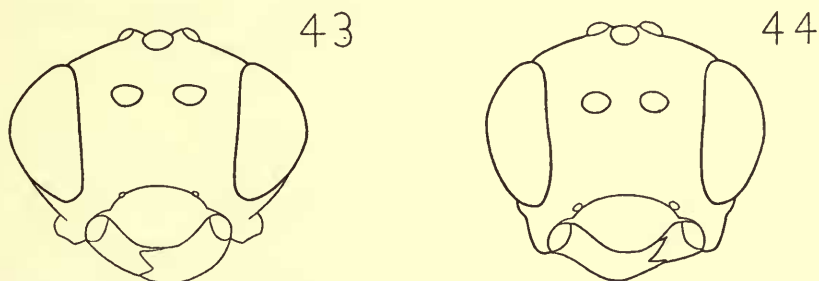
Head rounded and rather strongly narrowed behind eyes (decidedly less so than in *phaeorrhæus* Hal.); moderately and rather angularly emarginate behind: before occiput finely punctate above; on temples and cheeks for the most part moderately punctate, sparsely so between eyes and ocelli; on inner orbits rather finely punctate and on malar space densely so: epistoma of female rather finely punctate above to rather coarsely so below, on an alutaceous background, the punctures for the most part well separated; of male reticulate-punctate to rugose, the punctures not well separated except in mid line: upper face with median keel absent or very short; rather coarsely punctate, the punctures for the most part well separated. Clypeus as described for *phaeorrhæus* Hal. Malar space about three-quarters distance between mandibular apices, the gena not angularly raised before mandibular articulation. Genal region of the type described and illustrated (Fig. 52) for *phaeorrhæus* Hal., differing as follows: outer costa seen in frontal view as in Fig. 44, not forming a very distinct angle with the normal plane of the gena, not bulging so strongly outward, so that the genal cavity is less wide: inner costa running forward to a sharper point, but incomplete internally, so that the cavity is partly open behind: hypostomal costa more strongly and laminately raised, distinctly bent outward: the keel that arises from point of hypostomal costa does not run very close behind mandibular articulation nor appear to close the cavity in front: the keel that crosses the cavity from point of genal costa itself raised to a point.

Antennae with scape weakly excised externo-ventrally (Fig. 57); with postannellus about 1.7 times length of the following segment; with flagellum 25- to 27-segmented.

Pronotum as described for *phaeorrhæus* Hal., but laterally moderately punctate above. Propleura rather finely punctate. Mesoscutum rather strongly convex; with notaulices scarcely traceable; medially rather finely punctate, at sides more finely and anteriorly densely so. Scutellum strongly convex; rather finely to moderately

punctate; not margined to middle. Mesopleura not much rugose anteriorly; moderately punctate above, rather coarsely so below, and closely so almost throughout; sternalices broad and rather shallow and, like the mesosternum, rather finely and closely punctate: mesolcus rather deeply and sharply impressed, closed by an incised ridge behind: epicnemial carina much as described for *phaeorrhæus* Hal. Propodeum with costae moderately strong: finely to very finely punctate above, moderately so on area pleuralis: area basalis not falling sharply from apex: area posteromedia rugose, not elongate as in *phaeorrhæus* Hal. and thus not extending far beyond middle.

Gaster not strongly clavate as it is in *phaeorrhæus* Hal. Petiolar segment 2.0 to 2.1 times length of its greatest breadth; moderately auriculate basally; with dorsal keels



FIGS. 43-44. Head in facial view of Fig. 43. *Exyston phaeorrhæus* Hal. Fig. 44. *Exyston subnitidus* Grav.

not distinct to near apex, nor marking such an abrupt change of slope as in the previous species; conspicuously punctate, or in part rugose-punctate, in apical two-thirds. Tergite 2, like those following, normally finely punctate and shining; almost evenly convex between the thyridia, which are not very conspicuous. Female third valvulae weakly vomeriform.

Fore wings with basal and disco-cubital veins extraordinarily strongly convergent, so that a continuation of the lower abscissa of the disco-cubital, from point of ramellus, would meet the stigma before the point of emission of the radius; with areolet very distinctly petiolate; with nervus parallelus emitted slightly below middle of brachial cell. Hind wings and tarsal claws as described for *phaeorrhæus* Hal.

Length 6 to 7 mm.

Female. Head coloured as in female *phaeorrhæus* Hal., but the pale coloration more distinctly yellowed and rather less extensive; region of tentorial pits black. Antennae mainly black at base; to some extent paler towards apex above; in greater part dull fulvous below. Thorax black, with scutellum near apex, tegulae, and lower angle of pronotum yellowish-ivory: propleura black with inner margins flavous, or flavous with outer margins black. Gaster mainly castaneous, or with petiolar segment and bases of following tergites blackish: tergites somewhat paler at sides. Wings with costa yellow, with other veins and stigma more or less ferrugineous, paler at base.

Male. Head coloured as in male *phaeorrhæus* Hal., but neither specimen before me has more than a sub-triangular apical mark pale on clypeus. Thorax black with

tegulae more or less castaneous. Tergites 2 and following with distinct pale margins, these becoming broader and paler towards apex, which is mainly bright flavous.

Legs coloured much as in *phaeorrhæus* Hal., sex for sex; but the mid and hind coxae and the trochanters are blackish, a little paler beneath.

Redescribed from the following material: SWITZERLAND, Engadine national park, Zernetz dist., 1 ♀, 25.vii.1921, 1 ♂, 23.vii.1922, Grupshum, 1 ♂, 18.vii.1925: SPAIN, Valle de Ordesa, 1 ♀, viii.1931, J. M. Dusmet.

***Exyston albicinctus* Gravenhorst**

1820 *Ichneumon albicinctus* Gravenhorst, *Mem. Accad. Sci. Torino*, **24**: 375 (non *Ichneumon albicinctus* Gravenhorst 1829 = *Barichneumon locutor* Thunb.).

1829 *Tryphon albocinctus* Gravenhorst, *Ichneumonologia Europaea*, **2**: 204-205, **syn. n.**

1829 *Tryphon tricolor* Gravenhorst, *ibid.* **2**: 207-208, **syn. n.**

1878 *Exyston cinctulus* ♂ var. Brischke, *Schrift. naturf. Ges. Danzig*, **4**: 106.

1906 *Exyston albocinctus* Pfankuch, *Z. Hym. Dipt.* **6**: 222.

1906 *Exyston tricolor* Pfankuch, *ibid.* **6**: 223.

Head slightly narrowed or very slightly broadened behind eyes, and then strongly rounded; shallowly or rather shallowly emarginate behind: from level of lateral ocelli shining, with temples rather finely punctate: genae moderately to rather coarsely punctate, the punctures in many cases separated by less than their own diameters: malar space and inner orbits rather finely punctate: lower face coarsely, and in large specimens very closely punctate, the punctures somewhat squashed out of shape by their mutual proximity: upper face very closely beset with moderate punctures, often almost trans-rugose between antennal bases and median ocellus, and with a median keel running to the median ocellus. Clypeus irregularly punctate, rather coarsely so above, rather finely and sparsely so below; scarcely convex; very superficially, and very seldom at all sharply, delimited basally, and not set distinctly at an angle with lower face; apically distinctly bi-tuberculate. Malar space about equal to or, more usually, less than distance between mandibular apices in male, about one-fifth greater than such distance in female. Genal costa moderately raised; inflected much as in *pratorum* Woldst. (Fig. 48), but more angularly so in female: the gena not angled between costa and mandibular base, in position where in other species there is an outer costa. Hypostomal costa, where met by genal, bent outwards and raised rather to a point.

Antennae with scape (Fig. 55) moderately excised externally; with postannellus about twice length of the following segment, both measured along inner margin: flagellum 31- to 35-segmented.

Pronotum with epomiae of moderate strength or rather weak, not sharp; laterally moderately punctate above, closely punctate to rugose-punctate below. Propleura moderately and closely punctate, but rather sparsely so in the small specimen from Finland. Mesoscutum moderately and almost evenly convex; with notaulices not clearly indicated; finely to moderately punctate, sparsely so across disk, more closely so in front and behind. Scutellum rather strongly and evenly convex, though sometimes slightly buckled; rather coarsely and closely punctate; not distinctly margined beyond basal furrow. Mesopleura in front coarsely and closely punctate, often in part

rugose-punctate; behind more moderately and less closely punctate, but without a distinct impunctate speculum: sternaules broad but generally superficial: mesosternum densely and rather finely punctate: epicnemial carina moderately raised between and along fore margin of sternaules, then with margin curving inward; medially emarginate: mesolcus sharply impressed, often weakly transcostate, with either a strong costa closing it behind or else a series of weaker transverse costae in that position. Propodeum with areolation weak and incomplete in middle; in particular, the area superomedia is not or very indistinctly bordered basally and laterally, and the costulae are usually incomplete though always indicated: area posteromedia well bordered and transversely rugose: area angularis longitudinally rugose: area pleuralis moderately and rather closely punctate: area externa more finely and other lateral areas more coarsely punctate, all less closely so: area superomedia represented by a more or less distinctly shining patch, impunctate or sparsely punctate, often flanked by weak transverse rugosities.

Petiole segment of female 2.2 to 2.3 times, of male 1.9 to 2.1 times length of its greatest breadth; very strongly auriculate at base; with dorsal keels distinct in about basal third of segment, thereafter not or scarcely indicated in male, though with clearer indications in female; for the most part moderately punctate, but in middle third between positions of keels shining, and not or sparsely punctate. Remainder of gaster with tergite 2 discretely and for the most part moderately punctate; with remaining tergites more and more finely punctate towards apex. Female third valvulae vomeriform.

Fore wings with basal and disco-cubital veins strongly convergent; with areolet distinctly petiolate; with nervus parallelus emitted below middle of brachial cell. Hind wing with nervellus almost opposite, intercepted about in middle.

Tarsal claws not pectinate.

Length $6\frac{1}{2}$ to $11\frac{1}{2}$, normally 8 to 10 mm.

Female. Head black above a line running roughly transversely around, just below antennal sockets and foramen magnum; below this line ivory-white, much modified by flavous or fulvous, the pale coloration also extending some way up orbits of upper face: mandibles concolorous except at apex. Antennae with scape, pedicellus and postannellus mainly black, the scape conspicuously pale-marked in apical half below; with annellus mainly castaneous; with remainder of flagellum fulvous, ferrugineous for a short distance at base beneath and a much greater distance above. Thorax black, with the following parts pale-coloured as on head: pronotal collar, widely near hind angles, propleura totally, tegulae, small mark below fore wings and hind margin of mesopleura narrowly above, and large apical marks of scutellum and metascutellum; also on mesothorax a pair of marks that go broadly down lower halves of fore margins of pleura, then narrow on upper halves of sternaules, then greatly broaden along fore margin of mesosternum, then continue more narrowly backward beside mid line to closure of mesolcus. Legs with the following parts pale flavous: coxae, trochanters and trochanterelli, fore and mid femora anteriorly, and knees; with fore and mid femora behind, and with hind femora fulvous to castaneous; with tibiae and tarsi flavous to fulvous, the tarsi somewhat darkened, and the hind tibiae darkened above near apex and with a broad darker ring near base; with dark marks on femora,

hind trochanters and mid coxae at base, and with hind coxae mainly almost black above. Wing veins pale ferrugineous, except for the yellow costa: stigma ochreous. Petiolar segment black, with a median apical spot coloured as on following: remainder of gaster bright, pale fulvo-castaneous, the tergites more and more broadly margined apically and laterally with yellowish-white, tergites 6 and 7 being mainly so coloured, but the colour margins are not sharply defined: tergite 2 blackish at base, with yellow thyridia: sterna mainly yellowish.

Male differs as follows. Head for the most part black, including a very broad band inside basal margin of clypeus; with pale colour on remainder of clypeus, on middle and along basal margins of mandibles, and on maxillary and labial palps. Antennal scape without a pale mark beneath, or with an inconspicuous mark that does not reach apex of segment. Thorax black; with a small pale apical mark on scutellum, and sometimes an obscurer one on metascutellum: tegulae partly ferrugineous. Legs coloured as in female, but with fulvous coloration darkened; with coxae wholly or for the most part, trochanters usually in part and hind femora behind, black or almost so. Gaster coloured as in female, but usually tergites 3 to 5 are blackish at base and tergite 2 more than half black: the palest coloration is always less extensive and often more yellow.

Redescribed from the following material: BELGIUM, Steenbrugge, 1 ♂, 24.v.1875, Ghlin, 5 ♂♂, 17.vi.1877, Mont l'Enclus, 1 ♂, 26.v.1893, J. Tosquinet: HOLLAND, Exaeten, 1 ♂, vi.1884, 1 ♂, 5.vi.1887, A. Wasmann: GERMANY, Schwerin, 1 ♂, 11.vi.1889, S. Brauns: SWITZERLAND, Geneva, Peney, 1 ♀, 29.v.1876, 1 ♂, 5.vi.1889, 1 ♂, 20.vi.1889, Tournier; Champel, 1 ♂, coll. Buess; without data, 1 ♀: HUNGARY, Jászberény, 1 ♀, Moczar (mus. Stockholm): FINLAND, Åbo district, Uskela, 1 ♂, E. J. Bonsdorff, coll. Mäklin: EUROPE, unlocalized, 1 ♂ bought from Staudinger (Brit. Mus.).

Additional material seen: FRANCE, Paris district, Maisons-Laffitte, Rueil, Nantesse; Varennes, St. Baume, J. de Gaulle (4 specimens in mus. Paris): GERMANY, Crefeld, 1 ♀, vi.1928, A. Ulbricht.

Originally described from Piedmont, Italy, and the female synonym from the Rhineland. Brischke's insect was from the Danzig district: from his diagnosis I have no doubt that it belonged to this species. Evidently a very scarce species: Morley has already, quite rightly, rejected Stephens's British records.

Exyston sp.

1931 *Exyston genalis* Roman, *Ark. Zool.* **23A** (6): 14 (non Thomson 1883).

It is thought desirable to correct an existing record, but inopportune to validate this species with a name based on a single imperfect male. In order, however, to stimulate the search for further specimens, and to increase our understanding of the genus as a whole, the species has been separated in my key to palaearctic species, and is here further diagnosed.

A larger, more elongate species than *pratorum* Woldst.: length of unique male 10 mm. Upper face reticulate-punctate, not rugose. Clypeus sharply delimited basally. Malar space a little less than distance between mandibular apices. Post-

annellus 1.7 times length of following segment. Pronotum laterally moderately punctate above. Notaulices short and extremely superficial. Mesopleura coarsely punctate in front. Propodeum with costae normally complete and rather strong. Petiolar segment about 2.5 times length of its greatest breadth; weakly auriculate basally; with dorsal keels strong and almost percurrent. Tergite 2 reticulate-rugose in basal half, thereafter rugose-punctate. Fore wings with basal and disco-cubital strongly convergent. Tarsal claws not pectinate.

So closely related to the nearctic *E. boreotis* Davis (of which I have seen two pairs determined by H. K. Townes) that I thought it might be a form of that species. In the American specimens, however, the temples are finely or rather finely punctate; whereas in the Siberian they bear coarse punctures separated by less than their own diameters. I have been allowed to submit the specimen to W. R. M. Mason, who is of the opinion that it is not *boreotis* Davis but that, like that species, it belongs to the group of *variatus* Prov.

Exyston pratorum Woldstedt

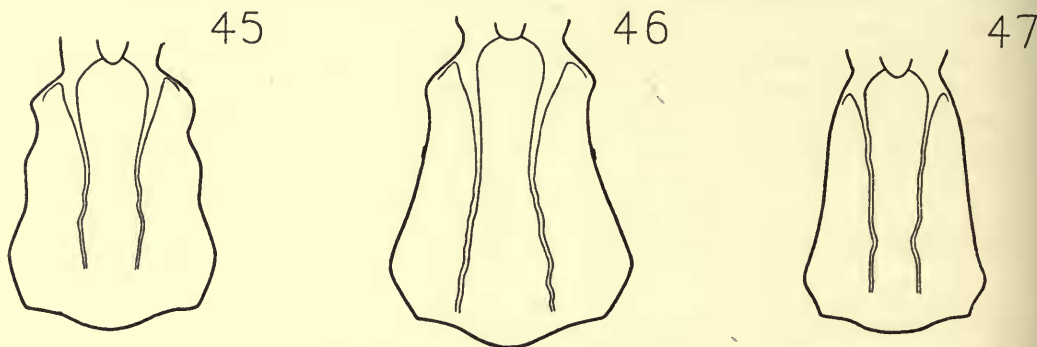
- 1858 *Exenterus triangulatorius* Holmgren, *Svensk Vet.-Akad. Handl.* **1**: 235 (non Gravenhorst 1829).
 1874 *Exenterus pratorum* Woldstedt, *Bidr. Känn. Finl. Natur Folk*, **21**: 52-53.
 1877 *Cteniscus (Tricamptus) pratorum* Woldstedt, *Bull. Acad. Sci. St. Pétersbourg*, **23**: 454.
 1883 *Exyston brevipetiolatus* Thomson, *Opuscula Entomologica*, fasc. 9: 883 (synonym by Hellén 1937).
 1911 *Exyston brevipetiolatum* Morley, *The Ichneumons of Great Britain*, **4**: 192-193.
 1911 *Exenterus phaeorrhoeus* Morley, *ibid.* **4**: 207 (non Haliday 1838).
 1911 *Exyston triangulatorius* Schmiedeknecht, *Opuscula Ichneumonologica*, **5**: 2300-2301.
 1937 *Exyston pratorum* Hellén, *Notul. Ent.* **17**: 124.
 1939 *Exyston phaeorrhoeus* Roman, *Ent. Tidskr.* **60**: 195 (non Haliday 1838).

Head slightly to moderately narrowed behind eyes and strongly rounded; rather shallowly to moderately emarginate behind: vertical region and temples very finely punctate, genae finely to moderately so; upper face finely to moderately and closely punctate, sometimes transrugulose just above antennae; epistoma rather coarsely punctate, sometimes reticulate in part. Clypeus for the most part rather coarsely punctate; sharply and rather deeply delimited basally; more or less weakly convex; often quite broadly rounded at apex. Malar space of female a little less than distance between mandibular apices; of male much shorter, about equal to width of annellus. Genal costa moderately raised, strongly but seldom angularly inflected (Fig. 48), often bearing short carinae in front: hypostomal costa strongly and roundedly raised, bent slightly outward. The gena is roundedly angulate between costa and mandibular base, in the position in which in other species there is an outer costa (see again Fig. 48): in male this angulation is carried farther back (dorsal), is much sharper near mandibular base, and bounds an intervening area that is more distinctly excavate behind articulation of mandible and is often distinctly though imperfectly transcarinate.

Antennae strongly hairy; with scape weakly excised externo-ventrally (Fig. 58); with postannellus generally less than 1.5 times length of following segment; with flagellum of female 23- to 26-, of male 22- to 25-segmented.

Pronotum with epomiaie rather strong and sharp; laterally very finely punctate

above, rugose in part below. Propleura finely punctate. Mesoscutum very strongly convex anteriorly, flattened discally; with notaulices shallowly impressed, but extending to beyond middle; more or less finely punctate, often with some faint rugulosity. Scutellum weakly to moderately convex; not margined to middle; generally finely punctate above, closely punctate or rugose-punctate behind, longitudinally rugose at sides. Mesopleura each with a large, almost impunctate area above; finely to moderately punctate below, moderately so above: sternaules broad and moderately impressed: mesosternum very finely punctate: epicnemial carina moderately



FIGS. 45-47. The very variable petiolar segment of *Exyston pratorum* Woldst. Fig. 45 drawn from a male from Orsa, middle Sweden, resembling the type and illustrating the applicability of Förster's diagnosis of *Tricamptus* to this species. Fig. 46 drawn from a normal female from Paanajärvi, NE. Finland, and Fig. 47 from a male from the New Forest in southern England, illustrating the other extreme condition.

raised between and along fore margin of sternaules, then bent upward on to mesopleura, medially almost completely interrupted: mesolcus moderately to strongly impressed, broadening posteriorly, closed behind. Propodeum with costae of moderate strength; mainly more or less finely rugose, but with some upper areae shining and very finely punctate, the area pleuralis generally discretely punctate in front, and the area posteromedia finely reticulate-rugose: area superomedia not distinctly delimited basally.

Petiolar segment (Figs. 45-47) short for an *Exyston*, 1.3 to 1.7 times length of its greatest breadth; dorsally reticulate-rugose, sometimes finely so; not strongly auriculate basally; with dorsal keels broad and flattened at base, thereafter not very strong though sometimes almost percurrent: spiracular tubercles undeveloped or more or less prominent. Remainder of gaster moderately punctate, finely so towards apex; with tergites 2, generally to beyond middle, and 3 at base longitudinally finely rugose. Female third valvulae small, vomeriform.

Fore wings with basal and disco-cubital veins almost parallel; with areolet sessile or sub-sessile; with nervus parallelus emitted below middle of brachial cell. Hind wings with nervellus strongly antefurcal, intercepted below middle.

Tarsal claws finely pectinate.

Length 5 to 7½ mm.

Female. Head black, with the following parts ivory-white, usually in part suffused

with flavous and margined with fulvous: palpi, mandibles except at apex, clypeus, genae broadly, and lower face largely. The pale colour on the gena usually extends beyond the angulation and on to the hypostomal costa; it extends broadly more than half-way up the sides of the lower face, which also bears a rather heart-shaped mark almost covering the epistoma: the pale marks on the lower face may be so largely confluent as to confine the lower black coloration to the tentorial pits. Antennae with basal segments mainly black, often castaneous at apex and sometimes more extensively below: beyond postannellus ferrugineous above, often paler towards base, dull fulvous below, often darker at apex. Thorax black, with the following parts pale-coloured as on head: propleura largely, tegulae, and scutellum and metascutellum at apex; usually lower angles of pronotum and often an extension along ventral margin, and generally a pair of marks on anterior margin of mesopleura; occasionally also marks on epicnemial, below bases of fore wings and down posterior margins of mesopleura. Fore and mid legs with coxae, trochanters and trochanterelli similarly pale-coloured, the trochanters dark-marked above, the coxae darkened usually only at base but sometimes more extensively; with femora fulvo-castaneous and with knees, tibiae, and tarsi fulvous to flavous: hind legs with coxae, trochanters, and trochanterelli black or almost so, pale at apex and on trochanterelli beneath; with femora, tibiae, and tarsi ferrugineous, the femora and tibiae more or less dull castaneous in middle or almost entirely, the tibiae sometimes much paler than the femora, and the knees conspicuously stramineous-white. Wing veins and stigma ferrugineous to fuscous, basally paler. Petiolar segment black. Remainder of gaster normally having tergite 2 black at base and sides, and 3 with isolated black marks at mid base and at anterior angles; with tergite 2 mainly rufocastaneous, the following similar but successively duller; with tergites having pale margins, yellowish to ivory, broader on successive segments to apex, covering most of tergite 6. In some specimens the black coloration is much more extensive, covering all of tergite 2 but the apical margin and thyridia; and in some the pale apical margins are much less pronounced.

Male differs as follows. Head without the pale marks on genae and sides of lower face, with heart-shaped mark on epistoma smaller, and with clypeus narrowly black along sutural margin. Thorax black; with tegulae generally pale; sometimes (as in type) with a transverse pale mark near apex of scutellum. Mid, and generally fore, coxae dark except at extreme apex. Gaster sometimes mainly black dorsally; pale margins of segments, on the average, narrower and sharper.

Redescribed from the following material: IRELAND, S. Tipperary, Ballinacourty, 1 ♀, W. Cork, Glengarriff, 1 ♀, Waterford, Dungarvan, 1 ♀, Queens Co., Portarlinton, 1 ♂, Woodbrook, 1 ♀, N. of Emo Park, 2 ♀♀, Wicklow, Clara, 3 ♂♂ (one seen by A. Roman, see Roman, 1939), 1 ♀, Arklow dist., 1 ♂, Ballinaclea, 1 ♂, Deputy's Pass, 1 ♀, Athdown, 2 ♀♀, 4.vi-26.vi and 26.vii-16.viii.1925-1945, A. W. Stelfox: SCOTLAND, Argyll, Puck's Glen, 1 ♂, 9.vi.1925, J. J. F. X. King; Inverness-shire, Aviemore, 1 ♂, 26.vi.1934, R. B. & J. E. Benson: ENGLAND, Devon, Cornworthy, 1 ♀, T. A. Marshall coll.; Kingsteignton, 2 ♂♂, 1 ♀, Hilber, 1 ♂, Lustleigh, 1 ♂, Newton Abbot, 1 ♂, 3-20.vi., 1933-1942, J. F. Perkins; Hants, New Forest, 1 ♂, 26.v.1912, G. T. Lyle, 2 ♀♀, 17-24.vi.1923, H. Scott; New Forest, Lyndhurst, 1 ♀, 18.vi.1907, C. Morley (see above, p. 370); Surrey, Oxshott, 1 ♂, 14.viii.1890, T. A. Marshall coll.; Abinger, 1 ♀,

28.viii.1947, G. J. K.; Herts., Brickett Wood, 4 ♂♂, 1 ♀, 26.v.-9.vi., 1936-1937, R. B. Benson; Lancs. mid, Carnforth, Leighton Moss, 1 ♀, 5.vi.1941, H. W. Miles; Westmorland, Foulshaw Moss, 1 ♂, 1 ♀, 8.vi.1941, G. J. K.: BELGIUM, unlocalized, 1 ♂, 4 ♀♀, C. Wesmael; Vivier d'Oie, 1 ♀, 18.v.1883, 1 ♀, 2.vi.1881, Orval, 1 ♀, 6.viii.1892, Stockel, 1 ♀, 13.viii.1890, J. Tosquinet: SWEDEN, Dalarne, Orsa, 1 ♂, 4.viii.1938, G. J. K.: FINLAND, Ladoga-Karelia, Sortavala, 1 ♂, 27.vi, Woldstedt (type); Kuusamo, Liikasenvaara, 1 ♀, 3.viii.1935, Paanajärvi, Ruskeakallio, 1 ♀, 17.vii.1935, G. J. K.: FRANCE, Paris district, Claman, 1 ♀, 5.vi.1892, Mesnil-le-Roi, 1 ♀, J. de Gaulle: SWITZERLAND, Buchholz, 1 ♀, 12.viii.1907, ? captor; Berisal, 1 ♀, vii.1909, J. de Gaulle; Valais, les Haudères, 1 ♂, 1 ♀, 6-27.vi.1935, Ferpècle, 1 ♂, 21-27.vi.1935, R. B. & J. E. Benson: GERMANY, Eisenberg, 1 ♀, Th. Kupka: CZECHOSLOVAKIA, Aussig, 1 ♂, 20.v.1935, 1 ♀, 19.vi.1932, Th. Kupka.

Further material seen: SWEDEN, material in Stockholm and Lund museums, including Thomson's type series: FRANCE, Mesnil-le-Roi, Maisons-Laffitte, Sèvres, J. de Gaulle, Vendresse, A. Seyrig, 8 specimens in Paris museum: GERMANY, Crefeld, 1 specimen, A. Ulbricht (Paris museum); Bodmann am Bodensee, 1 ♂, 26.v.1949, G. Heinrich; Helzen, 1 ♂, 17.v.1943, Stolzenau, 1 ♀, 3.vi.1945, Göttingen, 1 ♀, 13.ix.1949, R. Hinz: AUSTRIA, Styria, Admont district, 1 ♂, 1 ♀, 10.vi.1950, 1 ♀, 3.vii.1950, G. Heinrich.

The last-mentioned female specimen has the gena like that of the male, and has comparatively small yellow marks on the propleura.

This is a more than ordinarily variable species; yet, after examining all the above diverse material, I am satisfied that it does belong to a single species. The male specimen from Orsa, middle Sweden, has been presented to the British Museum collection: it agrees very well with the type, except that it has the petiolar segment more distinctly auriculate at base.

Fig. 45, of the petiolar segment, demonstrates that this species does not disagree with Förster's diagnosis of *Tricamptus*, so that Woldstedt's selection is valid whether the rules require agreement with the diagnosis or not. *Tricamptus* falls, therefore, as a synonym of *Exyston* Schiødte. This new synonymy has been published by Mason (1951, April: 230)

Time of appearance. Ulbricht (1926: 21) records that his dates of capture of this species were in May and the beginning of June, and then again in August. The dates of capture I have been able to record lead me to believe that there are two generations a year in most districts; for they range from 17.v to 3.vii and from 26.vii to 13.ix. The only exceptions are a single unspecified July date for a Swiss capture; and a mid-July date from NE. Finland, where the climate is such that one would expect a species normally having two generations a year to have only one.

Exyston 'triangulatorius' Hlgr. var. melanurus' Ulbricht

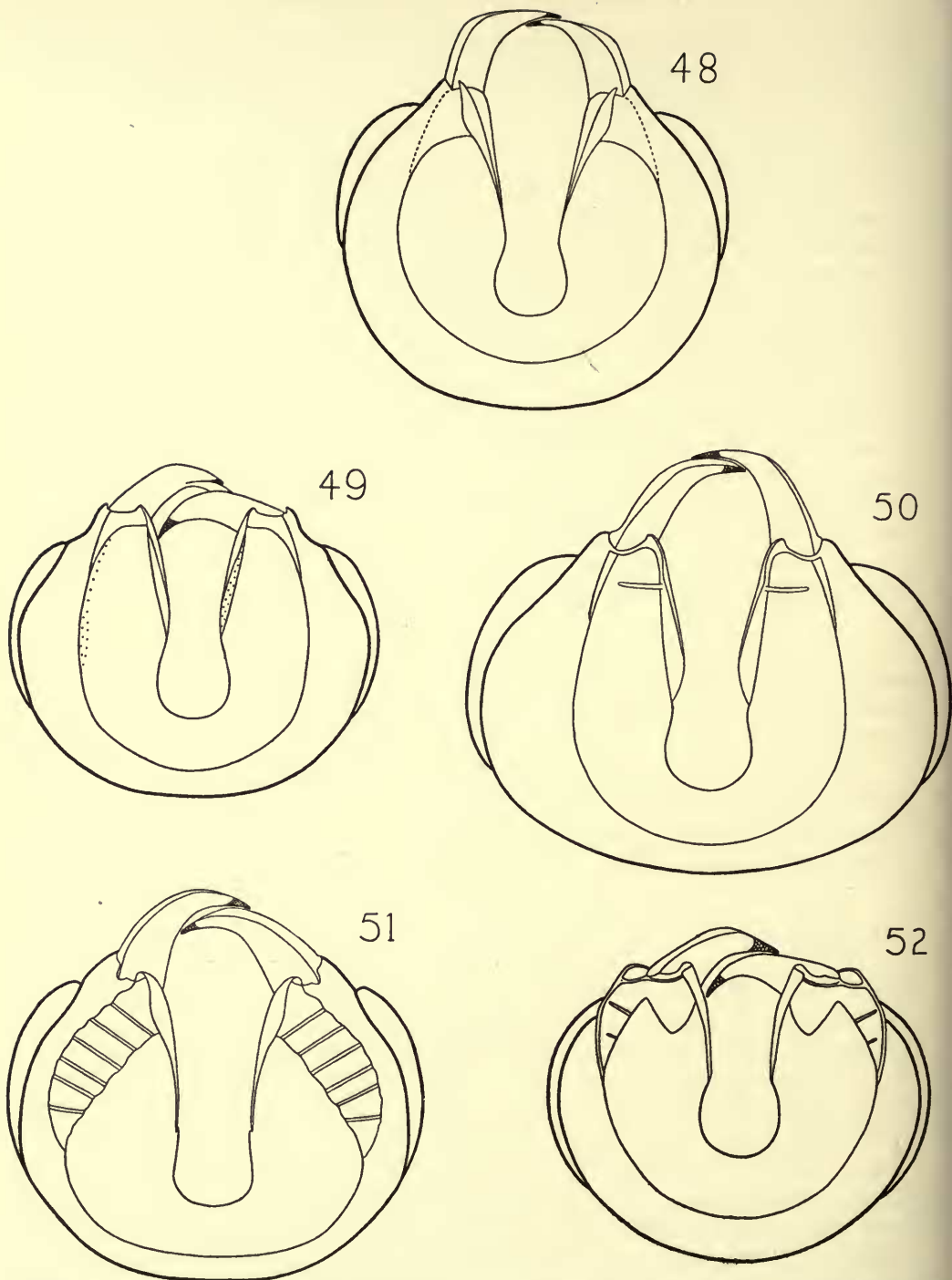
Ulbricht's variety *melanurus* was based on a specimen or specimens he had captured, and which he attributed to the last of the three varieties brought forward by Schmiedeknecht (1911: 2301). He gave as description 'Hinterleibspitze schwarz gefleckt', within inverted commas; but this was not an exact quotation of Schmiedeknecht, whose words were 'Var. 3. ♂. Die hinteren Segmente schwärzlich gefleckt.'

Moreover, the varieties presented by Schmiedeknecht were not always original, but may often be traced to an earlier author. These three varieties may be traced to Holmgren (1858: 235), whose actual relevant words were 'var. 3 ♂: abdomine nigro-notato'.

Through the kindness of Herr B. Maixner I have been able to see the Ulbricht material of *Exyston* in the Crefeld museum. All specimens standing under this species are correctly determined to species. Three stand under the species name, unqualified, and others under three varietal numbers. Two of these segregates may be considered to correspond with varieties mentioned by Schmiedeknecht, if numbers be transposed and the sexes reversed [actually Schmiedeknecht's var. 1 is the usual condition for the male, but I have never seen a female to correspond]. But the specimens under Ulbricht's remaining number, his var. 2, are not mutually consistent in colour pattern, not even approximately so. One of the specimens not arranged as a variety is labelled 'var. 2 Hlgr.' So I feel able to select as lectotype of *melanurus* Ulbricht another specimen not arranged as a variety. This is a small male specimen having a small blackish spot on tergite 6, to the right of the midline, and also correspondingly at extreme base of tergite 7. This mark is clearly individual and of no real varietal significance. The only other specimen that might have served is a male arranged under var. 2, having tergite 5 mainly infuscate above but not tergite 3. No doubt it was a specimen marked in some such way as that that Holmgren placed as his var. 3.

KEY TO PALAEARCTIC SPECIES OF *EXYSTON* SCHIØDTE

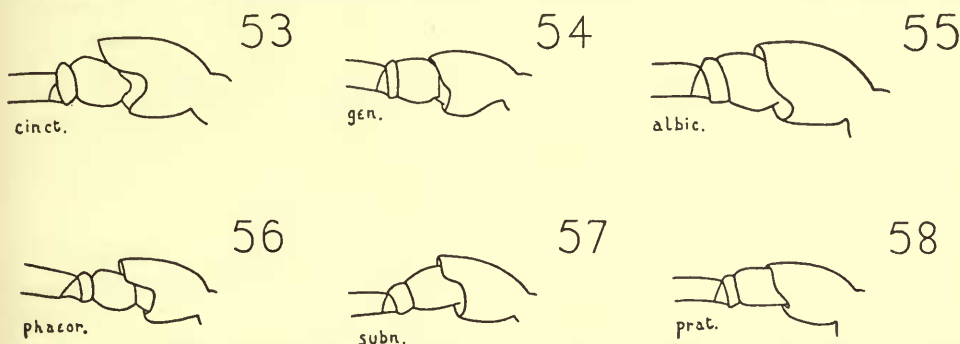
1. Genal costa single and not remote from mandibular base (Figs. 49, 50): female third valvulae not vomeriform: scape deeply excised externally (Fig. 53). 2
 Genal costa double, or single and remote from mandibular base: female third valvulae vomeriform: scape not deeply excised externally except in *phaeorrhaeus* Hal. (easily distinguished in facial view, Fig. 43). 3
2. Genal costa continuous or almost so (Fig. 50). *cinctulus* Grav.
 Genal costa inflected, though not remote from mandibular base (Fig. 49)
 *cinctulus* Grav. ab. *approximatus* nov.
3. Genal costa double, the outer costa continuous or almost so, the inner costa inflected 4
 Genal costa single and strongly inflected (e.g. Fig. 48) 6
4. Genal costae crenulate, rather regularly curved (Fig. 51), the intervening space traversed by a series of ridges: petiolar segment elongate and slender, at least 2.5 times length of its greatest breadth near apex: flagellum more than 30-segmented *genalis* Thoms.
 Inner genal costa very strongly sinuate and pointed (e.g. Fig. 52): petiolar segment not 2.5 times length of its greatest breadth: flagellum less than 30-segmented 5
5. A very strongly hairy species, with gaster strongly clavate: gena (Figs. 43, 52) as in detailed description (p. 378): antennal scape strongly excised externally (Fig. 56): tergite 2 to beyond middle closely beset with moderate punctures and not shining: fore wings with basal and disco-cubital not extraordinarily strongly convergent *phaeorrhaeus* Hal.



FIGS. 48-52. Head in hind view of Fig. 48. *Exyston pratorum* Woldst. Fig. 49. *Exyston cinctulus* Grav. ab. *approximatus* nov. (lower tooth of right mandible malformed). Fig. 50. *Exyston cinctulus* Grav., normal. Fig. 51. *Exyston genalis* Thoms. Fig. 52. *Exyston phaeorrhæus* Hal.
Fig. 48 drawn freehand.

A much less strongly hairy species, with gaster scarcely clavate: gena (Fig. 44) differing as detailed in description (p. 380): antennal scape weakly excised externo-ventrally (Fig. 57): tergite 2 finely and rather sparsely punctate and shining: fore wings with basal and disco-cubital extraordinarily strongly convergent *subnitidus* Grav.

6. Clypeus very superficially delimited basally and not set distinctly at an angle with lower face: propodeum with areolation weak and incomplete in middle; in particular, the area superomedia is not or very indistinctly bordered basally and laterally: tergite 2 discretely punctate and shining *albicinctus* Grav.



FIGS. 53-58. Left antennal scape, &c., in sinistro-lateral view, of Fig. 53. *Exyston cinctulus* Grav. Fig. 54. *Exyston genalis* Thoms. Fig. 55. *Exyston albicinctus* Grav. Fig. 56. *Exyston phaeorrhæus* Hal. Fig. 57. *Exyston subnitidus* Grav. Fig. 58. *Exyston pratorum* Woldst.

Clypeus quite deeply and sharply delimited and set distinctly at an angle with lower face: propodeum with areolation normally complete and moderately strong: tergite 2 at least finely rugose in about basal half 7

7. A larger, more elongate species, with length of unique male 10 mm.: antennae normally hairy: pronotum laterally moderately punctate above and mesopleura coarsely punctate in front: petiolar segment about $2\frac{1}{2}$ times length of its greatest breadth: fore wings with basal and disco-cubital strongly convergent: Kamtchatka, R. Malaise (*genalis* Roman 1931 *non* Thomson) sp.

A moderate-sized species, not more than about 7 mm. in length: antennae very strongly hairy: pronotum laterally very finely punctate above and mesopleura no more than moderately punctate: petiolar segment about $1\frac{1}{2}$ times length of its greatest breadth: fore wings with basal and disco-cubital almost parallel: a rather common European species *pratorum* Woldst.

ALTERNATIVE KEY TO EUROPEAN SPECIES OF *EXYSTON* SCHIÖDTE

In the foregoing key a natural arrangement has been attempted, and the fullest use made of diagnostic characters. The following may serve for the readier separation of species known from Europe, especially where few specimens are available, and the hinder head and female valvulae cannot be clearly observed:

1. Antennal flagellum almost always more than 30-segmented 2
 Antennal flagellum less than 29-segmented 4

2. Clypeus very superficially delimited basally: areolation of propodeum decidedly incomplete in middle: petiolar segment not 2.5 times length of its greatest breadth *albicinctus* Grav.
 Clypeus quite deeply and sharply delimited basally: areolation of propodeum normally complete: petiolar segment often more than 2.5 times length of its greatest breadth near apex (e.g. Pl. 5) 3
3. Antennal scape deeply excised externally (Fig. 53): hind trochanter dark- or dull-marked above; scutellum pale-marked at apex except in the darkest males *cinctulus* Grav.
 Antennal scape weakly excised externo-ventrally (Fig. 54): female hind trochanter usually, and male scutellum immaculate *genalis* Thoms.
4. Antennal scape strongly excised externally: gena strongly angularly raised, bulging outward as seen in facial view in Fig. 43: gaster strongly clavate *phaeorrhæus* Hal.
 Antennal scape not strongly excised: gena not thus raised: gaster not strongly clavate 5
5. Antennae normally hairy: tergite 2 sparsely and finely punctate, not rugose: fore wings with basal and disco-cubital extraordinarily strongly convergent: hind tibiae not whitish at base *subnitidus* Grav.
 Antennae very strongly hairy: tergite 2 finely longitudinally rugose to beyond middle: fore wings with basal and disco-cubital almost parallel: hind tibiae conspicuously stramineous-white at base. *pratorum* Woldst.

Genus *PAREXYSTON*, gen. n.

Genotype *Exyston calcaratus* Thoms. (monobasic).

Reference to this new genus is made in the discussion of genera (pp. 313-314), and the characters are defined in the key to genera (pp. 316-319). The single described species has previously been placed in *Exyston*; but I think it is more closely related to *Smicroplectrus*, and particularly to *S. clémenti* sp.n. (p. 404).

***Parexyston calcaratus* Thomson**

When studying the series in the Thomson collection in 1938 I noted the following characters additional to those given by Thomson (1883): head shining; narrowed behind eyes but not much rounded; very broadly emarginate behind. Cheeks very long. Hypostomal and genal costae strongly elevated: the genal costa is not double, but the cheek is angulate therefrom to the lower articulation of the mandible. Antennae incrassate almost to apex, with apical segment pointed. Thorax shining: epomia very long and strong: notaulices very strong: scutellum margined to beyond middle, but not sharply: epicnemial carina strongly raised: sternaules broad: mesolcus deeply impressed, open behind. Propodeum dorsally rugose, shining on area pleuralis; with costae strong: area superomedia sub-hexagonal, emitting costulae in middle: area petiolaris extending to middle. Petiolar segment rugose; with basal lobes; with dorsal keels not strong but almost percurrent. Tergite 2 with sculpture

basally rugose, apically finer; thyridia large, about half breadth of space between them. Remaining tergites shining.

Description from 2 ♀♀, 4 ♂♂ in Thomson collection.

Since that date, the following material has been examined: IRELAND, Co. Wicklow, Monagloch, 1 ♀, 8.vi.1926, A. W. Stelfox: ENGLAND, Devon, Kingsteignton, Starks Ponds, 1 ♂, 2 ♀♀, 29.v-1.vi.1942, Highweek, 1 ♂, 1 ♀, 22.v.1942, Newton Abbot, 1 ♂, vi.1940, J. F. Perkins; Notts., Teversall, 1 ♀, 26.vi.1913, J. W. Carr (recorded as *brevipetiolatus* Thoms.); Suffolk, Monks Soham, flying at blackthorn, 2 ♀♀, 23.v.1920, C. Morley (recorded as *subnitidum* Grav.): HOLLAND, Oisterwijk, 1 ♀, 18.vi.1943,

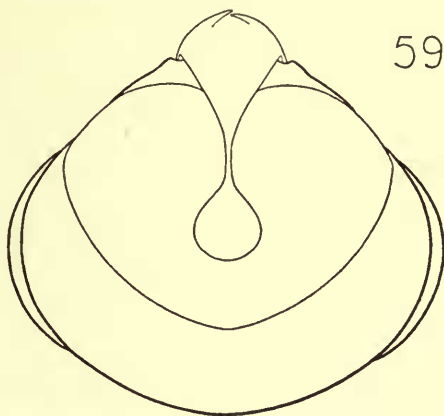


FIG. 59. Head in hind view of *Parexyston calcaratus* Thoms.

H. G. M. Teunissen: SWEDEN, Skåne, Höör district, 1 ♂, 28.vi.1938, D. M. S. & J. F. Perkins: FINLAND, Keuru, 1 ♀, W. Hellén (recorded as *pratorum* ab. *nigriceps* Hellén); Hattula, 1 ♂, L. v. Essen: GERMANY, Berlin district, 1 ♀, Ruthe coll.

Of the above, the Ruthe collection specimen is $6\frac{1}{2}$ mm. in length, and has the thorax and propodeum largely rufous, as in the syntypes. With one exception, the remaining specimens are of a much smaller form, 4 to $4\frac{1}{2}$ mm. in length, and have the ground colour of the thorax and propodeum black or blackish. This form looks so distinct that I would have thought it merited varietal status; but the specimen from Holland is an intermediate, having a length of $5\frac{1}{2}$ mm. and the thorax notably paler than in this form. The large rufous and the small dark forms are not or not widely geographically separated, for both have been taken in the southern Swedish province of Skåne.

The second segment of the maxillary palps is strongly swollen in this species.

The earlier British record of this species (Carr, 1924: 53) was based on three specimens of *Smicroplectrus quinquecinctus* Grav.

Genus *SMICROPLECTRUS* Thomson

1883 *Smicroplectrus* Thomson, *Opuscula Entomologica*, fasc. 9: 881-882, 888.

If our knowledge of the genus *Exyston* in Europe has been in an unsatisfactory condition, our knowledge of European *Smicroplectrus* has been quite rudimentary.

Though there are other good characters available for the separation of some of the species, it is the form of the hinder gena that is of prime importance, and this has never before been properly studied. Roman (1913: 128), from the study of a single female specimen in the Stockholm museum, discovered that in *S. quinquecinctus* Grav. there is a double genal costa, the inner costa being sharply raised and inflected: in all other forms known to him he found no outer costa. He failed to observe the difference in the form of the gena of *jucundus* Hlgr. from that in *bohemani* Hlgr., and considered that there was no more than one species described under *bohemani*, *jucundus*, and *costulatus*.

After prolonged study, I recognize eight European species; and of these, only one remains a unique type, and this one is very distinct. All seven others are represented in my material by series of over twenty specimens. It is hoped that this revision will provide a sound basis for the study of at least the European species: I now find I can place well over 90 per cent. of the specimens confronting me. Doubt of the identity of some of the males, especially smaller ones, is no cause for wonder; but it is vexing as well as perplexing to be still unable to place four female specimens. One of these specimens, however, looks like an intermediate between two of the recognized species. Since *Smicroplectrus* species are, so far as is known, almost all attached to Nematine sawflies on catkin-bearing plants, predominantly *Salix*, it seems quite possible that hybridization would sometimes occur.

The difficulty of discriminating the species was greatly increased by the existence of small, pale forms, which I recognize in five species, of which the majority of specimens are larger and darker. These forms are of smaller size and have fewer antennal segments than normal individuals: the general darker body colour is altogether paler, though the pale colour may be brighter; the punctuation is weaker, though the grosser sculpture may be more outstanding. Whether these differences are due to the use of different hosts, to nutritional differences in individuals, or to rate of development at a particular time of year is not known. They do, however, intergrade with the normal, and cannot even be regarded as distinct varieties.

Apart from these small, pale forms, which do not seem previously to have been noted, the European species are very uniform in general colour pattern. Thus it has happened that species have not been described on concomitant colour characters, as happened in most Ichneumonid genera, and several are now new. For the eight European species recognized, only five names are available; and I place two of these as synonyms, having examined all the types concerned. The colour characters that have been used, such as the colour of the hind coxae, and the presence or absence of a pale apical mark on the scutellum, are found to break down; and are unlikely to do more than provide negative evidence in some cases and within defined regions. The degree of development of the costula is quite unreliable for separating the species.

The type species, *S. quinquecinctus* Grav., is also regarded as the typical species, and others are to a large extent described in comparison with it.

Tryphon incisus Grav. was placed in *Exenterus* by Pfankuch (1906), but transferred to this genus by Schmiedeknecht (1911) on account of the mention of a relatively long hind tibial spur. I have seen the single female specimen in the Gravenhorst collection, and can state that the hind tibial spur is about two-fifths the length of the metatarsus,

and that the mid tibia bears two spurs. The species can, therefore, be excluded not only from this genus but from the tribe Cteniscini. I did not, at the time, identify it positively; but, from my recollection of it, I suppose it to belong to the Polyblastina.

Smicroplectrus quinquecinctus Gravenhorst

1820 *Ichneumon quinquecinctus* Gravenhorst, *Mem. Accad. Sci. Torino*, **24**: 374.

1829 *Tryphon quinquecinctus* Gravenhorst, *Ichneumonologia Europaea*, **2**: 165-166.

1858 *Exenterus erosus* Holmgren, *Svensk Vet.-Akad. Handl.* **1**: 227.

1906 *Smicroplectrus quinquecinctus* Pfankuch, *Z. Hym. Dipt.* **6**: 94.

Head (Figs. 63, 64) not strongly transverse; moderately, sometimes rather strongly, narrowed behind eyes in female and strongly so in male, slightly rounded; moderately emarginate behind: with vertical region and orbits finely and sparsely punctate; before occiput and on temples and cheeks moderately so; cheeks below and upper face much more coarsely and densely punctate, and epistoma still more coarsely and densely so, bearing punctures separated by much less than their own diameters: sometimes the sculpture is rugose on mid line above and below antennal bases. Clypeus sparsely and rather finely punctate below, more coarsely and densely so above; rather deeply delimited, with tentorial pits conspicuous; not strongly convex basally, and rather shallowly impressed before the narrowly rounded apex. Malar space longer than distance between mandibular apices in female, about as long in male. Genal costa strongly laminately elevated, not or scarcely angularly inflected: gena with an outer costa elevated at least part way back from mandibular base, thence completed as an angulation running to genal costa. Hypostomal costa strongly raised, evenly rounded below junction of genal costa. Genal pit enclosed by these costae distinctly broader along genal costa than its length along hypostomal (Fig. 69).

Antennae with scape (Fig. 60) weakly excised externo-ventrally: flagellum 26- to 32-segmented, moderately explanate in middle.

Pronotum with dorsal transverse furrow shining; with epomiae sharp and of moderate strength; laterally strongly punctate above, finely rugulose-punctate below. Propleura strongly punctate. Mesoscutum strongly convex anteriorly; with notaulices strongly impressed anteriorly, running far beyond middle and falling into a median depression; rather finely to moderately punctate, much more densely so anteriorly between notaulices. Scutellum strongly convex; finely and sparsely punctate above, more coarsely and densely so at sides and behind; margined usually to about middle but sometimes well beyond; more or less longitudinally impressed on disk. Mesopleura rather coarsely to coarsely punctate, rather closely below, more moderately so above, and with a shining speculum: sternaules broad, rather shallowly impressed: mesosternum finely and densely punctate, prepectus strongly so: epicnemial carina dorsally incomplete, distinctly elevated in female and slightly so in male: mesolcus narrow but deeply impressed, a little broadened posteriorly, closed behind. Propodeum with costae moderately strong, sometimes strong; with dentiparal areae weakly produced and with costulae complete or incomplete; finely rugose to rugose-punctate, with the area pleuralis moderately and discretely punctate,

and the area posteromedia more or less rugose, generally transversely so: area basalis not delimited apically: area superomedia more or less explanate to near apex, moderately rounded behind.

Gaster on tergites 1 and 2 mainly, and 3 at least at base, coriaceo-rugose; elsewhere mainly alutaceo-punctate, generally strongly so, giving the surface a decidedly matt appearance; with the hinder segments smoother and more shining towards apex. Petiolar segment (Fig. 74) 1.4 to 1.8, often less than 1.6 times length of its greatest breadth; strongly margined, with basal lobes pointed, sometimes acutely so; with dorsal keels rather strong and almost percurrent. Tergite 2 with diagonal basal impressions fairly distinct but ill-defined.

Fore wings with stigma and radial cell of normal, rather elongate shape: stigma about 4.0 times (varying 3.6 to 4.3), radial cell about 2.8 times as long as broad; with basal and disco-cubital veins nearly parallel; with areolet rather small and sub-sessile or shortly petiolate; with nervus parallelus emitted in middle of branchial cell. Hind wings with nervellus opposite or slightly antefurcal and intercepted about in middle, or a little below.

Legs of normal, slender form: hind metatarsus about 7 times length of its greatest breadth in inner side view in female, 6 to 7 times in male. Tarsal claws moderately, sometimes weakly pectinate.

Length of normal form 7 to 12 mm.

Female. Head black, with the following parts ivory-white, often in large part pale flavous, sometimes merging to fulvous, particularly on palpi: clypeus, genae, lower face, except narrowly below and between antennae, and mouth-parts except mandibular apices. Antennae dark above, below with scape pale flavous, and the segments that follow pale flavous, merging to fulvous in apical half of antenna. Thorax and propodeum black, with the following parts pale-coloured as on head: anterior margin at sides and humeral angle of pronotum, propleura, tegulae, laminate margins of mesoscutum behind tegulae, wide margin of prepectus, sometimes a pair of marks beside mesolcus, line below fore wings, mesepimera, scutellum at apex and metascutellum and their lateral extensions, and piliferous lobes of metanotum. The scutellum is often more or less dull fulvous discally, and the propodeum may be dull fulvous marked. Legs mainly fulvous to rufous; with fore and mid coxae and trochanters and fore femora anteriorly flavous, merging to fulvous: apical segment of mid tarsus and hind femora at apex infusate: hind tibiae and tarsi almost black, sometimes paler below: hind coxae and trochanters occasionally darkened. Wings slightly infumate, with veins and stigma fuscous to ferrugineous, basally pale. Gaster black: tergite 1 sometimes with a median apical spot, and following tergites more and more broadly margined apically and laterally with ivory-white, the margins often bordered anteriorly with pale fulvous: the white colouring covers more than half the exposed surfaces of tergites 6 and 7.

Male. Differs from the female as follows: genae more narrowly pale, usually black between outer and inner costae; lower face occasionally black in mid line. Propleura generally quite black, occasionally pale near mid line and behind: pale margins of pronotum and prepectus absent or reduced to mere dots. Hind coxae and trochanters usually in greater part black: fore and mid coxae sometimes dark-marked (especially

in British specimens). Pale margins of tergites becoming broader towards apex of gaster much more gradually; the white colouring usually covering less than half the exposed surfaces of tergites 6 and 7.

This species is illustrated on Pl. 6.

Redescribed from the following material: SCOTLAND, Inverness-shire W., Arisaig, 1 ♂, 9.vii.1939, A. W. Stelfox: ENGLAND, Dorset, Studland, South Haven Peninsula, 12-acre Wood, 1 ♀, 22.vi.1934, G. J. K. (compared with Gravenhorst material and with type of *erosus* Hlgr.); Surrey, Chobham, 1 ♀, 16.v.1891, Melville-Bury coll.; Essex, Colchester, 3 ♂♂, 1914; Suffolk, Sudbury, 1 ♂, 1921, W. B. or B. S. Harwood; Bucks., Princes Risborough, 1 ♀, 21.vi-4.vii.1942, Brickhill, 1 ♂, 21.vi.1937, Herts., Brickett Wood, 1 ♂, 9.vi.1936, R. B. Benson; Staffs., Lichfield district, 2 ♂♂, 1 ♀, 1923, L. A. Carr (one recorded as *Exyston calcaratus* Thoms.); Yorks., Ayton Wood, 1 ♀, 10.vii.1921, F. Pepper: BELGIUM, unlocalized, 1 ♀, C. Wesmael; Groenendaele, 1 ♀, 27.vi.1880; Ormeignies, 1 ♀, 29.viii.1880; Hestreux, 2 ♀♀, 6.viii.1884; Rhode St. Genèse, 1 ♂, 27.vi.1884; Vivier d'Oie, 1 ♀, 19.viii.1888; Espinette, 1 ♂, 26.v.1890; Verrewinkel, 1 ♂, 4.vi.1891, J. Tosquinet: HOLLAND, Venlo, 1 ♀, 21.vi, 1 ♂, 24.viii, 1 ♀, 29.viii.1942; Meiendel, 1 ♀, 13.vii.1939, 1 ♂, 1 ♀, 6.vi.1940; Schayk, 1 ♀, 19.vi.1948, H. G. M. Teunissen: SWEDEN, Skåne, Höör district, 1 ♂, 13.vii; Röstånga, 1 ♀, 5.vii, Degaberga, 1 ♀, 10.vii.1938, D. M. S. & J. F. Perkins; Småland, 1 ♀, C. Boheman (type of *erosus* Hlgr.): FINLAND, Lojo, 1 ♀, R. Krogerus; 1 ♀, 17.viii.1918, Håkan Lindberg: FRANCE, Sèvres, 1 ♀, 3.vi.1895, J. de Gaulle: SWITZERLAND, Nyon, 1 ♀, Cheyr: GERMANY, Göttingen, 1 ♀, 29.vi.1948, Helzen, 1 ♀, 26.v.1943, 1 ♂, 28.v.1945, R. Hinz; Bavaria, Bodmann am Bodensee, 1 ♀, 19.vi.1949, Bayrische Wald, Waldmünchen, 800 m., 1 ♀, 16.vi.1948, G. Heinrich; Görkau, 1 ♀, vii.1930, Th. Kupka: CZECHOSLOVAKIA, Bohumin, 1 ♀, 14.vii.1938, Th. Kupka; Chodau, 1 ♀, 27.vii.1886, R. von Stein: RUSSIA, Orel, 1 ♀, 22.vi, 1 ♂, 26.vi.1943, R. Hinz.

Further material seen: FRANCE, Maisons Laffitte, 3 specimens, J. de Gaulle.

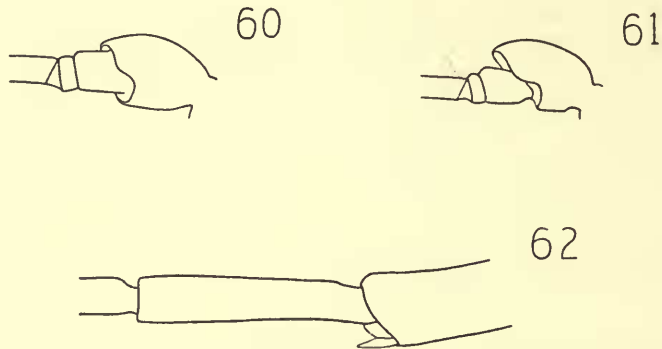
The small, pale form of this species has the costae of the propodeum and petiolar segment very strongly developed, but the punctation in parts relatively poorly so. Apart from the paler colour, especially of legs and gaster, it agrees with the description of the species given above. Antennal flagellum 26- to 27-segmented: length $6\frac{1}{2}$ to 7 mm. Described from the following: BELGIUM, 1 ♂, 1 ♀, C. Wesmael: GERMANY?, 1 ♀, O. Schmiedeknecht: SWEDEN, Skåne, Kivik, 1 ♀, 19.vii.1938, D. M. S. & J. F. Perkins.

The Irish record of this species (W. F. Johnson, 1915: 132) is based on a male of *Acrotomus succinctus* Grav.

I do not think it will be possible to determine, from Gravenhorst's description of 1820, which species of *Smicroplectrus* he then had before him. Since the original material is not to be found in the Spinola collection in Turin (see Kerrich, 1950), we must accept the monograph of 1829 as the first revision. The England, Dorset, specimen was compared by me with the specimens in Breslau in 1938, and was found to be the same species. In 1947 I compared it with the type of *erosus* Hlgr. and thus confirmed the synonymy suggested by Pfankuch (1906).

Smicroplectrus excisus sp. n.

Head (Fig. 65) not strongly transverse; sharply and, in type form, almost rectilinearly narrowed behind eyes; shallowly emarginate behind: finely to moderately punctate, seemingly on the average more finely so in male; cheeks below, lower face and upper face densely and rather coarsely punctate, occasionally rugose-punctate. Clypeus more sparsely punctate and usually apically less narrowly rounded than in *quinquecinctus* Grav., the punctures fine to moderate; rather deeply delimited, with tentorial pits conspicuous; in type form not strongly convex basally, and rather



FIGS. 60-61. Left antennal scape, in sinistro-lateral view, of Fig. 60. *Smicroplectrus quinquecinctus* Grav. Fig. 61. *Smicroplectrus excisus* sp.n. Fig. 62. Left hind metatarsus in inner side view of *Smicroplectrus excisus* sp. n.

shallowly impressed before apex. Malar space about equal to distance between mandibular apices in female, distinctly less in male. Genal costa laminately elevated, though less strongly than in *quinquecinctus* Grav., angularly inflected: gena with outer costa and genal pit as described for *quinquecinctus*. Hypostomal costa strongly raised, obtusely round-pointed below junction of genal costa.

Antennae with scape (Fig. 61) strongly convex above and very deeply excised externo-ventrally: flagellum normally 25- to 30-segmented, moderately explanate in middle.

Pronotum with dorsal transverse shining impression narrow, rather indeterminate; with epomiae rather strong; laterally rather strongly punctate above, more finely rugulose-punctate below. Propleura moderately to rather coarsely but shallowly punctate. Mesoscutum in type form weakly convex anteriorly, but often rather strongly so; with notaulices broad but not deeply impressed anteriorly, running far beyond middle and falling into a median depression; moderately and sparsely punctate, rather more finely and densely so anteriorly. Scutellum strongly convex, normally not margined to middle; moderately and usually sparsely punctate discally, much more densely punctate to rugose-punctate peripherally; slightly impressed on disk. Mesopleura rather coarsely punctate, with a shining speculum: sternaules broad, moderately impressed: mesosternum finely and densely punctate, more sparsely so behind: prepectus coarsely alutaceo-punctate, deeply excavate: epicnemial carina moderately elevated: mesolcus broad, moderately to deeply impressed,

almost always transcostate, closed by a strong costa behind. Propodeum with costae rather strong; with costulae complete; finely punctate to rugose, with area pleuralis discretely punctate except below; with area posteromedia much more strongly rugose: area basalis delimited apically: area superomedia usually almost regularly hexagonal, emitting costulae about in middle, but sometimes much more strongly narrowed to base and with costulae well behind middle.

Gaster on tergites 1 mainly, and 2 and 3 at base, coriaceous-rugose, but petiolar segment sometimes almost smooth between the dorsal keels; elsewhere usually finely and rather sparsely punctate and strongly shining. Petiolar segment normally 1.3 to 1.6 times length of its greatest breadth; moderately strongly margined; with basal lobes pointed, sometimes acutely so; with dorsal keels of moderate strength to strong, almost percurrent. Tergite 2 with diagonal basal impressions usually distinct and rather strong, but ill-defined.

Wings as described for *quinquecinctus* Grav., but stigma and radial cell on the average about 10 per cent. relatively broader.

Legs relatively stouter than in *quinquecinctus* Grav., notably the hind tibiae and tarsi: hind metatarsus about $5\frac{1}{2}$ times length of its greatest breadth in inner side view (Fig. 62). Tarsal claws moderately pectinate.

Length $5\frac{1}{2}$ to 10 mm.

Differs little in coloration from *quinquecinctus* Grav. The scape and pedicellus below have the pale coloration generally duller and more restricted. The lower face is often more broadly black below the antennae and more distinctly on the mid line above, and the clypeo-frontal suture is dark: by contrast the propleura are pale-marked. In female, the pale marks of pronotum are less conspicuous, and the propleura are to some extent dark at sides: in male the pale margin of prepectus is often well developed, though narrower than in female. Coloration of legs similar in female: in male the hind coxae and trochanters are mainly fulvous. The pale margins of the tergites are less extensive. Wings similar.

Described from the following material: BELGIUM, unlocalized, 1 ♂, 1 ♀, coll. Wesmael; unlocalized, 1 ♂, 12.vii.1881, Hestreux, 3 ♀♀, 5-6.viii.1884, Orval, 1 ♀, 7.viii.1892, J. Tosquinet: HOLLAND, Voorburg, on *Salix*, 1 ♀, 5.viii.1939, Biesbosch, 1 ♀, 23.vi.1943, H. G. M. Teunissen: SWEDEN, Skåne, Pålshö, 2 ♂♂, 4 ♀♀, coll. C. G. Thomson; Röstänga, 2 ♀♀ (one the holotype), 1 ♂ (allotype), 4.vii.1938, Höör district, 2 ♂♂, 26-28.vi.1938, D. M. S. & J. F. Perkins; province Halland, 3 ♂♂, 23-27.vi.1907-1911 (mus. Stockholm): FRANCE, ?France, 1 ♂ (under *Ct. sexcinctus* Grav.), J. de Gaulle; Ardennes, Verdun, 1 ♀, 10.viii.1925, Benoist: SWITZERLAND, unlocalized, 1 ♂, D. Imhoff (mus. Turin): GERMANY, Upper Bavaria, Haag-an-der-Amper, 1 ♂, v.1948, G. Heinrich; Celle, 1 ♀, 4.vii.1942, Göttingen, 1 ♂, 7.viii.1946, R. Hinz; 2 ♀♀, probably Berlin district, Ruthe coll.; Warnemünde, 1 ♀, viii.1886, S. Brauns (Nat. Mus. Ireland); unlocalized, 1 ♀, O. Schmiedeknecht (mus. Genoa): POLAND, Pomorzia, Sepolno, 2 ♂♂, 23-24.vi.1936, G. Heinrich: RUSSIA, Orel, 2 ♂♂, 26.vi.1943, R. Hinz.

Small pale form: GERMANY, 1 ♂, 8.ix.1854, Ruthe coll.; Warnemünde, 1 ♀, viii.1886, S. Brauns.

Holotype in British Museum (Natural History).

This species is variable in a number of respects. In the type form the head is

almost rectilinearly narrowed behind the eyes (Fig. 65), the clypeus is not strongly convex basally, the mesoscutum is weakly convex anteriorly, and the scutellum is not strongly margined: in other specimens the head is decidedly rounded behind the eyes, the clypeus is much more strongly convex basally, the mesoscutum is rather strongly convex anteriorly, the scutellum is more strongly margined, and the body colour is rather paler. In the small pale form the body colour is altogether paler, the gaster is mainly ferrugineous, and the hind tibiae and tarsi are ochreous to ferrugineous: the flagellum is 23- to 26-segmented, and the length is $4\frac{1}{2}$ to $5\frac{1}{2}$ mm. Such differences might be due to the use of different host species, or to the nutrition of the individual hosts. The Thomson collection contains a series of five females and five males, all from Pålshö: 1 ♀, 3 ♂♂ are of the small, pale form; and both other forms are included but are not sharply separable. All agree in the peculiar conformation of the scape and the gena, and in the possession of relatively short and thick hind legs: these characters distinguish the species most readily from its nearest known relative *quinquecinctus* Grav.

This species was identified by C. G. Thomson and Brauns as *erosus* Hlgr. but, as shown above, the synonymy of *erosus* Hlgr. with *quinquecinctus* Grav. has now been confirmed.

***Smicroplectrus trianguligena* sp. n.**

Head not strongly transverse; moderately to rather strongly narrowed behind eyes in female, rather strongly to strongly so in male, less rounded than in *quinquecinctus* Grav.; rather shallowly emarginate behind: on vertical region and temples finely or rather finely punctate, and on genae and orbits of lower face moderately so; on epistoma rather coarsely punctate, sometimes in part confluent so: upper face rather finely to moderately and densely punctate, often transversely rugose-punctate above antennal sockets. Clypeus as described for *quinquecinctus* Grav. Malar space about equal to distance between mandibular apices in female, a little less in male. Genal costa moderately raised, a little less so than in *bohemani* Hlgr., more or less angularly inflected: hypostomal costa much as described for *quinquecinctus* Grav. Gena (Fig. 70) sharply angulate in position of outer costa, the angulation sometimes a little raised near mandibular articulation: the enclosed genal pit usually longer, along hypostomal costa, than its breadth along genal, and often traversed by one or two weak costae.

Antennae much as described for *quinquecinctus* Grav.: flagellum 28- to 33-segmented.

Thorax and propodeum structure differing from that described for *quinquecinctus* Grav. as follows: propleura moderately alutaceo-punctate: mesoscutum more evenly convex: epicnemial carina less elevated and sternalia very superficial: propodeum with costae generally strong; with area supermedia sometimes weakly delimited basally: area pleuralis with punctation weak or rather weak.

Gaster with tergites 1 and 2 mainly, and 3 at base, coriaceous-rugose; elsewhere shining, more and more finely punctate towards apex: otherwise as described for *quinquecinctus* Grav., but petiolar segment on the average a little longer, 1.6 to 1.9 times length of its greatest breadth.

Wings as described for *quinquecinctus* Grav., but areolet usually longer petiolate. Legs slender as in *quinquecinctus* Grav.: tarsal claws rather weakly pectinate. Length $7\frac{1}{2}$ to 11 mm.

Coloration very much as described for *quinquecinctus* Grav., but male propleura regularly pale-marked near mid line, and sometimes more extensively so. Male hind coxae not darkened in any but the Irish specimens. Pale margins of tergites sometimes less extensive.

Described from the following material: ENGLAND, Staffs., Lichfield dist., 1 ♂, 1921, L. A. Carr (recorded as *jucundus* Hlgr., Carr, 1924: 53): BELGIUM, unlocalized, 2 ♂♂, 1 ♀, C. Wesmael; Vivier d'Oie, 1 ♂, 29.v.1891, 1 ♀, 17.vii.1898 (?), J. Tosquinot: HOLLAND, Meindel, 1 ♂, 2.vi.1937, H. G. M. Teunissen: FRANCE, Maisons-Laffitte, 1 ♂ (no date), St. Cloud, 2 ♂♂, 11-12.v.1887, Vincenne, 1 ♂, 30.iv.1890, Mendon, 1 ♀, 23.vi.1891, Mesnil, 1 ♀, 20.v.1892, Forêt de St. Germain, 1 ♂, 5.v.1894, Fontainebleau, 1 ♀, 17.vi.1898, J. de Gaulle; Nantes, 2 ♀♀, T. A. Marshall; Mayenne, la Sanbee, 1 ♀, 24.v.1926, Coulans, 1 ♀, 24.v.1926, Benoist; Yonne, Mezilles, 1 ♀, v.1940, 1 ♀, vi.1946, E. Cavro; 'St. Dii.N.' (? France), 2 ♂♂, 15.v.1921, Haut-Rhin, Bollwiller, 2 ♀♀, 30.v.1920 (one of the type), Roderv, 1 ♂, 12.vi.1932, A. Seyrig: SWITZERLAND, Nyon, 1 ♀, Cheyr; Peney, 1 ♂, 1886, Tournier: GERMANY, Rhineland, Geisenheim Notgottes, Forsthaus Rüdesheim, 1 ♂, 13.v.1923, E. Schmidt; Göttingen, 1 ♂, 10.v.1947, R. Hinz; Bodmann am Bodensee, 1 ♀, 17.v.1949, G. Heinrich: CZECHOSLOVAKIA, Erzgebirge, Aussig, 1 ♂, 26.v.1935, Th. Kupka: POLAND, Włodzimierz, 1 ♀, 17.vi.1944, R. Hinz: EUROPE, 1 ♀ (no interpretable data).

Type ♀ in Muséum d'Histoire Naturelle, Paris.

This species comes between *quinquecinctus* Grav. and *bohemani* Hlgr.; and small specimens, especially males, may be difficult to separate from both. It does, however, differ from both in having the greater part of the gaster not alutaceo-punctate but strongly shining. The male hind coxae are not darkened in any but the doubtfully associated Irish specimens mentioned below, whereas those of *quinquecinctus* are considerably darkened in all western European material seen.

Provisionally I place here four small male specimens having the following data: IRELAND, Co. Wicklow, Powerscourt, 2 ♂♂ em. 4-11.v.1932, *ex* sawfly larvae, G. C. Scott; George's Bridge, 1 ♂, 19.v.1940, Co. Dublin, Glenasmole, 1 ♂, 21.v.1939, A. W. Stelfox. Length of these specimens 6 to 8 mm.: flagellum 23- to 27-segmented. In correlation with the small size, however, the characters are weakly developed; and confirmation of the occurrence of this species in Ireland by the capture of the female is much to be desired. Mr. Stelfox has kindly presented one of the Powerscourt specimens to the British Museum (Natural History).

Confirmation of the single English record would also be very acceptable.

***Smicroplectrus bohemani* Holmgren**

1858 *Exenterus Bohemani* Holmgren, *Svensk Vet.-Akad. Handl.* **1**: 226-227.

1911 *Microplectron Bohemani* Schmiedeknecht, *Opuscula Ichneumonologica*, **5**: 2310, 2311.

1913 *Smicroplectrus Bohemani* Roman (*pars*), *Ent. Tidskr.* **34**: 128.

Head not strongly transverse; slightly to moderately narrowed behind eyes in female and moderately to rather strongly so in male, rather strongly rounded pos-

teriorly; shallowly emarginate behind: on vertical region and temples rather finely and sparsely punctate, more densely so before occiput: genae rather coarsely and more or less densely, upper face densely and rather coarsely, and epistoma coarsely punctate; upper face and epistoma usually alutaceous and more or less confluent punctate. Clypeus coarsely and rather densely punctate above, sparsely and much more finely so below; deeply delimited; usually moderately convex basally and rather shallowly impressed before apex, which generally is narrowly rounded. Malar space about equal to distance between mandibular apices. Genal costa distinctly but not strongly laminately elevated, not angularly inflected, meeting hypostomal costa a moderate distance behind mandibular base, about as in *quinquecinctus* Grav. (Fig. 69): gena with no outer costa, but strongly rounded in that position. Hypostomal costa less strongly elevated than in *quinquecinctus* Grav., rounded or very obtusely pointed below junction of genal costa.

Antennae with scape rather weakly or moderately excised externo-ventrally: flagellum 26- to 32-segmented.

Pronotum with dorsal transverse shining impression narrow, deeply impressed; with epomiae strong and sharp; laterally rather coarsely and very densely punctate above, merging to alutaceo-punctate below. Propleura densely and rather coarsely punctate. Mesoscutum normally convex anteriorly; with notaulices deeply impressed and often transcostate anteriorly, running far beyond middle and falling into a median depression; finely to moderately punctate, more finely and densely so anteriorly between notaulices. Scutellum moderately convex; usually rather strongly punctate above, densely so behind; slightly impressed on disk. Mesopleura coarsely and more or less densely punctate, less coarsely so above, and with a shining speculum: sternalices superficial: mesosternum rather finely and densely punctate, more sparsely so posteriorly: prepectus coarsely and very densely punctate: epicnemial carina weakly elevated: mesolcus narrow anteriorly, broadened posteriorly, moderately impressed, incompletely closed behind. Propodeum generally with costae strong and costulae complete; with dentiparal areae often rather strongly produced; finely to moderately rugose, with the area posteromedia usually strongly so, and the area pleuralis for the most part discretely punctate: area basalis not delimited apically: area superomedia rather shining and often somewhat excavate.

Gaster as described for *quinquecinctus* Grav., but usually less strongly alutaceo-punctate and with diagonal basal impressions indistinct: petiolar segment 1.3 to 1.7 times length of its greatest breadth.

Fore wings as described for *quinquecinctus* Grav.; but hind wings with nervellus often intercepted well below middle.

Legs slender as in *quinquecinctus* Grav.: tarsal claws weakly to moderately pectinate.

Length of normal form 7 to 12½ mm.

Coloration very much as described for *quinquecinctus* Grav., but the ivory-white usually purer, with much less flavous. Lower face of female sometimes black more than half-way down in mid line; of male sometimes black except for inner orbits and a pair of pale marks on epistoma: male genae only narrowly pale. Trochanterelli usually mainly flavous, and hind coxae often distinctly flavous at apex: hind femora

sometimes extensively darkened; male coxae and trochanters less often and on the average less extensively darkened than in *quinquecinctus* Grav.: male hind knees inconspicuously pale. Pale margins of tergites often less extensive.

Redescribed from the following material: ENGLAND, unlocalized, 1 ♀, Desvignes coll.; Herts., Brickett Wood, 1 ♂, 5.v.1950, R. B. Benson; Notts., Oxtun Bogs, 1 ♀, 14.vii.1915, J. W. Carr: HOLLAND, Venlo, 1 ♀, 21.vi.1942, H. G. M. Teunissen: SWEDEN, Skåne, Lund, 1 ♀, 31.v.1939, W. Hellén; Småland, 'Össt. Lars', 1 ♀, 17.vi.1911 (mus. Stockholm); Stockholm, 2 ♂♂, C. Boheman (one the type); Dalarne, Orsa, 1 ♀, 4.viii.1938, G. J. K.: FINLAND, Karislojo, 1 ♂, 13.vi, R. Forsius; Helsing, 1 ♀, W. Hellén; Tampere, Aitolahti, 1 ♀, 22.vi.1932, V. Saarinen: SWITZERLAND, Zürich, 1 ♀, Buchecker coll.: GERMANY, probably Berlin district, 1 ♀, Ruthe coll.; Celle, 1 ♂, 25.v.1942, 2 ♀♀, 27.vi.1942, Munster, 1 ♀, 2.viii.1942, R. Hinz; Upper Bavaria, Haag-an-der-Amper, 3 ♂♂, 2 ♀♀, v.1948, G. Heinrich: CZECHOSLOVAKIA, Bohemia, Chodau, 1 ♀, 1.vi.1882, R. von Stein; Bohumin, Haatsch, 1 ♀, 24.vii.1938, Th. Kupka: SIBERIA, Kamtchatka, 2 ♀♀, R. Malaise.

Small pale form has body colour altogether paler: antennal flagellum 22- to 27-segmented: length $5\frac{1}{2}$ to 7 mm.: BELGIUM, Mont St. Aubert, 1 ♀, 1.vi.1878, J. Tosquinet: SWEDEN, Småland, Lommaryd, 1 ♀ (mus. Stockholm): EUROPE, unlocalized, 1 ♀, O. Schmiedeknecht.

***Smicroplectrus sibiricus* sp. n.**

Head rather strongly transverse, more so than in *perkinsorum* sp.n. (Fig. 66); strongly rounded and almost broadened behind eyes; shallowly emarginate behind: finely to moderately and rather densely punctate; lower face more coarsely so. Clypeus rather coarsely punctate; evenly rounded apically; deeply delimited, with tentorial pits conspicuous; scarcely convex basally, but distinctly impressed before apex. Malar space slightly less than distance between mandibular apices. Genal and hypostomal costae much as described for *bohemani* Hlgr.; but the hypostomal less strongly elevated, and the genal meeting it relatively nearer mandibular base. Mandibles with lower tooth contracted, as in *jucundus* Hlgr.

Antennae with scape weakly excised externo-ventrally: flagellum 23-segmented, very little explanate in middle, but rather strongly hairy, and with the segments very distinctly separated.

Pronotum with dorsal transverse shining impression narrow, deeply impressed; with epomiae sharp and of moderate strength; laterally rather coarsely but shallowly and not densely punctate above, longitudinally rugose just behind epomiae and below. Propleura alutaceo-punctate. Mesoscutum very strongly convex anteriorly; with notaulices weakly impressed; moderately punctate, more finely and densely so anteriorly between notaulices. Scutellum rather strongly convex anteriorly, falling rather gradually behind; not margined to middle; shining and almost smooth on disk, finely rugose-punctate at sides and along hind margin. Mesopleura moderately and rather sparsely punctate, with a shining speculum: sternaules broad, rather superficial: mesosternum shining and finely punctate, sparsely so posteriorly: epicnemial carina very distinctly elevated, not quite complete dorsally: mesolcus deep, transcostate, almost closed behind. Metascutellum moderately raised. Propodeum

with costae rather strong and costulae complete; with area externa rugulose-punctate, elsewhere mainly rather strongly rugose: area basalis not delimited apically: area superomedia slightly rounded at sides and behind.

Gaster on tergite 1 mainly, and on 2 to beyond middle, finely rugose; elsewhere shining and moderately punctate, more finely so towards apex. Petiolar segment about 1.5 times length of its greatest breadth (female); distinctly margined; with anterior angles not acutely pointed; with dorsal keels distinct and almost percurrent, though not strong. Tergite 2 with basal diagonal impressions not distinct.

Fore wings with stigma and radial cell relatively broad: stigma about 2.8 times, radial cell about 2.3 times as long as broad. The areolet is relatively a little larger, but in other respects the wings are as described for *quinquecinctus* Grav.

Hind tibiae without the minute spur characteristic of the genus. Tarsal claws weakly pectinate, with only two or three slender teeth.

Length 6 mm.

Coloration of head and body much as in *quinquecinctus* Grav., but the pale colour is purer ivory-white, and the pale margin of the prepectus is reduced to a relatively narrow band on the ventral surface and a pair of rather large lateral marks. Wing veins paler than in *quinquecinctus* Grav. Fore and mid legs mainly pale fulvous; with coxae, trochanters and trochanterelli ivory-white, the coxae darker marked at extreme base: hind legs mainly pale ferrugineous, but with coxae mainly almost black; with femora at apex and tibiae at base conspicuously ivory-white; with coxae at extreme apex, trochanters and trochanterelli in part, and first four tarsal segments basally, ivory-white.

SIBERIA, Yeniseisk, 1 ♀, J. Sahlberg.

Holotype in Royal Natural History Museum, Stockholm.

The white hind knees and absence of a hind tibial spur are characters shared with *annulipes* Cresson and *velox* Walley. H. K. Townes has very kindly sent me a female specimen of each of these nearctic species. Both differ from *sibiricus* as follows: costae of propodeum strong; petiolar segment with dorsal keels very strong; with basal lobes acute-pointed and very prominent: tergite 2 with strong longitudinal rugosities; with diagonal impressions very strong and deep. *S. annulipes* differs also in having the dentiparal area of the propodeum strongly produced, the tarsal claws strongly pectinate, the thorax ventrally red, and the hind tibiae very broadly and distinctly white in the middle. The area posteromedia of *annulipes* I should describe as moderately rugose transversely, not as aciculate, as given by Davis (1897: 233).

***Smicroplectrus clémenti* sp. n.**

Head strongly transverse, more so than in *perkinsorum* sp.n. (Fig. 66); rather strongly narrowed and rounded behind eyes; rather shallowly emarginate behind: on vertical region and temples finely punctate, towards and on greater part of genae rather finely so; near mandibular base, and on inner orbits and upper face moderately punctate, and on epistoma rather coarsely and densely so. Clypeus rather finely punctate above, almost impunctate below; rather deeply delimited; rather strongly and almost evenly convex; moderately rounded at apex. Malar space about three-

quarters distance between mandibular apices. Genal costa moderately laminately elevated, bulging outward (Fig. 73), not angularly inflected: gena with no outer costa, but roundedly angled in that position. Hypostomal costa strongly and rather sharply raised.

Antennae with scape weakly excised externo-ventrally: flagellum 24-segmented.

Pronotum with epomiae of moderate strength; laterally rather finely punctate above, finely so below. Propleura very shallowly, moderately to rather coarsely punctate. Mesoscutum rather strongly convex; with notaulices rather deeply impressed for a short distance near, but not reaching anterior margin; finely to rather finely punctate. Scutellum moderately convex, rather irregularly punctate, margined to about middle. Mesopleura moderately and not densely punctate below, rather finely so above, with speculum rather extensive: sternaules broad, moderately impressed: mesosternum finely and densely punctate: epicnemial carina rather strongly raised: mesolcus sharply impressed, closed behind. Propodeum with costae of moderate strength and costulae complete; rather finely rugose, with area pleuralis in greater part and area externa discretely punctate: area superomedia a little broader than long, basally delimited.

Gaster with tergites 1 and 2 mainly, and 3 at base, weakly coriaceous-rugose; elsewhere shining and finely punctate. Petiolar segment relatively long, 2.0 times length of its greatest breadth; distinctly margined, with basal lobes pointed and with spiracular tubercles rather prominent; rather much raised in middle, but with dorsal keels not strong and not distinct much beyond half length of segment.

Wings as described for *quinquecinctus* Grav., but basal and disco-cubital veins distinctly divergent, the basal meeting the first cubital at an acute angle.

Legs rather short and stout, about as in *perkinsorum* sp.n.: hind tibiae without the minute spur characteristic of the genus: tarsal claws not pectinate.

Length $6\frac{1}{2}$ mm.

Differs in coloration from *quinquecinctus* Grav. as follows: pale colour mostly bright flavous, extending some way up orbits of upper face, that on antennae scarcely merging to fulvous: colour pattern of thorax as described for *perkinsorum* sp. n. (p. 407). Leg colour much as described for *sibiricus* sp.n. (p. 404), but fore and mid coxae and trochanters mainly pale flavous, hind knees not nearly so conspicuously pale, and hind tibiae broadly luteous in middle. Gaster pale ferrugineous, the margins bright flavous.

AUSTRIA, 'Carinth. alp.', 1 ♀, C. Boheman.

Holotype in Royal Natural History Museum, Stockholm.

Dedicated to the late Ernst Clément, in recognition of his pioneer work on the intensive revision of groups of European Ichneumonidae.

It seems very likely that this unique specimen is a small pale form of a species normally larger and darker.

***Smicroplectrus perkinsorum* sp. n.**

Head (Fig. 66) rather strongly transverse; moderately narrowed and rounded behind eyes; rather shallowly emarginate behind; in side view (Fig. 67): on vertical

region and temples finely and rather closely punctate, the punctures becoming gradually coarser towards mandibular articulation: genae rather finely to moderately and epistoma moderately punctate; upper face densely and rather finely so. Clypeus as described for *quinquecinctus* Grav., but more sharply delimited basally, and usually more broadly rounded at apex (considerable variation in this): the punctuation also is weaker in smaller specimens. Malar space slightly less than distance between mandibular apices in female, distinctly less in male. Genal costa sharply carinate but not laminate, not angularly inflected: gena falling to a deep, longitudinal pit beside hypostomal costa; the pit bounded externally by a sharp angulation of the gena. Hypostomal costa (visible in Fig. 67) exceptionally strongly elevated and acutely, or almost acutely, round-pointed below junction of genal costa; falling evenly to foramen magnum.

Antennae with scape weakly or rather weakly excised externo-ventrally: flagellum 21- to 26-segmented, relatively short and thick, and not much attenuate to apex.

Pronotum with dorsal transverse shining impression narrow; distinctly rugose-punctate before it; with epomiae sharp and rather strong; moderately and densely punctate above, more or less longitudinally rugose below. Propleura rather coarsely but shallowly punctate. Mesoscutum rising rather sharply from pronotum; with notaulices broad and strongly impressed anteriorly, running far beyond middle and falling into a median depression; finely to rather finely punctate. Scutellum weakly convex; moderately and rather irregularly punctate; margined to about middle; more or less impressed on disk. Mesopleura rather coarsely punctate, with speculum large: sternaules broad, rather shallowly impressed in female, shallowly in male: mesosternum rather finely punctate, sparsely so behind: prepectus rugose-punctate at sides, very deeply excavate: epicnemial carina distinctly but not at all strongly raised: mesolcus very deeply impressed, incompletely closed behind. Metascutellum short, moderately raised. Propodeum with costae relatively weak or rather weak; with costulae complete or incomplete, always indicated but sometimes indefinite internally and usually so externally; finely rugose including the area pleuralis, which is often somewhat shining but not discretely punctate; with area posteromedia rather more strongly rugose, having a median longitudinal carina at least indicated posteriorly but usually almost complete: area basalis delimited or not delimited apically: area superomedia of rather inconstant shape, more or less explanate to near apex, moderately rounded to almost truncate behind, usually emitting costulae well behind middle.

Gaster on tergite 1 mainly, and 2 and 3 at base, coriaceo-rugose; elsewhere finely alutaceo-punctate, not matt but generally not strongly shining. Petiolar segment (Fig. 75) relatively elongate, 1.8 to 2.2 times length of its greatest breadth; not strongly margined; with basal lobes very bluntly rounded, or at any rate of similar general shape; with dorsal keels rather weak, extending to rather near apex. Tergite 2 with diagonal basal impressions indistinct.

Fore wings with stigma and radial cell relatively broad: stigma about 3.0 times (varying 2.8 to 3.3), radial cell 2.1 to 2.6 times as long as broad: with areolet sometimes longer petiolate: in other respects the wings are as described for *quinquecinctus* Grav.

Legs relatively stouter than in *quinquecinctus* Grav., particularly the tibiae: tarsal claws distinctly, but weakly or rather weakly pectinate.

Length of normal form 6 to 8 mm.

Differs in coloration from *quinquecinctus* Grav. as follows: genae on the average more narrowly yellow: pale colouring frequently extending well up orbits of upper face in female: scape and pedicellus below with pale coloration usually duller and more restricted. Propleura often largely black in female: pale coloration of pronotum more restricted: pale margin of prepectus represented by a narrow transverse line in middle and a pair of lateral dots, but these sometimes undeveloped in female, as almost always in male: no fulvous colouring on thorax. In both sexes the fore and mid coxae are usually to a greater or lesser extent dark, and the hind coxae and trochanters mainly black or almost so: all trochanterelli flavous: hind femora often extensively darkened: hind tibiae and tarsi not nearly black, but ferrugineous or paler. Pale margins of tergites rather less extensive than in *quinquecinctus*, the pale coloration stramineous to pale flavous.

Described from the following material: ENGLAND, unlocalized, 1 ♂, 3 ♀♀, T. Desvignes coll.; Cornwall, Botusfleming, 1 ♀, T. A. Marshall; Devon, Lustleigh, 1 ♂, 11.vii.1934, R. C. L. Perkins (type), 1 ♂, 23.v, 1 ♂, 1 ♀, 3.vi.1933, J. F. Perkins; Bovey Tracey, 1 ♀, viii.1933, Dartmoor, 2 ♂♂, 1 ♀, 8-25.vi.1935, 1 ♂, vi.1938, R. C. L. Perkins; Newton Abbot, 1 ♂, 22.vi.1938, R. C. L. Perkins, 3 ♂♂, vi.1941, 1 ♂, 1 ♀, 10.vi, 1 ♂, 2 ♀♀, 14.vi, 1 ♀, 16.vi.1941, 1 ♀, vi.1942, J. F. Perkins (some taken on wild rose); Kingsteignton, Starks Ponds, 10 ♂♂, 2 ♀♀, 24.v-5.vi.1942, J. F. Perkins; Highweek, 9 ♂♂, 1 ♀, 22.v-9.vi.1942, D. M. S. Perkins and J. F. Perkins; Dunsford, 1 ♂, vi.1941, Milber, 1 ♀, vii.1941, J. F. Perkins; Dorset, Studland Heath, 1 ♂, 6.vi.1928, R. B. Benson; Oxon., Henley, 1 ♀, 25.vi.1906, H. Scott; Surrey, Oxshott, 1 ♂, 28.v.1933, J. F. Perkins; Bucks., Beaconsfield, 1 ♂, 27.v.1934, J. F. Perkins; Herts., Brickett Wood, 1 ♂, 17.vi.1936, Brickhill, 1 ♀, 21.v.1937, R. B. Benson; Suffolk, Sudbury, 1 ♀, 1926, Essex, Wivenhoe, 1 ♀, 25.v.1915, W. B. or B. S. Harwood; Yorks., Holmhouse Wood, 1 ♀, 15.vi.1935, J. Wood: BELGIUM, Stockel, 1 ♀, 10.vi.1890, Steinbach, 1 ♀, 12.vi.1896, Rhode St. Genèse, 1 ♀, 27.vi.1884, Mont l'Enclus, 1 ♀, 4.vii.1890, J. Tosquinet: HOLLAND, Babberich, 1 ♀, 14.vi.1941, Venlo, 2 ♂♂, 30.v-1.vi.1942, H. G. M. Teunissen: FINLAND, Kirjavalaks, 1 ♂, W. Hellén; Isthmus karelicus, Rajajoki, 1 ♀, 17.vi.1934, K. Lahtivirta: FRANCE, Paris district, Maisons Laffitte, 1 ♀, 24.v, J. de Gaulle: GERMANY, Köln, 1 ♂, 12.v.1942, W. Aerts; Celle, 1 ♂, 25.v.1942, Hannover, 1 ♂, 8.vi.1948, R. Hinz; Blankenburg-i-Thüringen, 1 ♀, 1.vi.1924, H. Hedicke (mus. Paris); Odenwald, 1 ♂, 20.v.1939, Th. Kupka; Bavaria, Erzgebirge, Görkau, 1 ♂, Th. Kupka; Bodmann am Bodensee, 1 ♀, 28.v.1949, G. Heinrich.

The small, pale form of this species has the body colour altogether paler than that of the typical form: the hind tibiae are pale ochreous; and the gaster is pale ferrugineous, with the margins of the tergites sometimes bright flavous. Agreeing in structure with the typical form. Antennal flagellum 22- to 25-segmented: length 5 to 6½ mm. Described from the following: ENGLAND, unlocalized, 1 ♀, T. Desvignes: CZECHOSLOVAKIA, Erzgebirge, Aussig, 2 ♀♀, 17.vi.1934; unlocalized, 2 ♂♂, Th. Kupka.

Holotype ♀ in British Museum (Natural History).

Structurally, this is the most distinct species of *Smicroplectrus* in Europe. It is also distinct in having been taken on wild rose; but it has not yet been bred, and this association remains to be investigated.

I have much pleasure in dedicating this species to Dr. R. C. L. Perkins and to Mr. and Mrs. J. F. Perkins.

***Smicroplectrus heinrichi* sp. n.**

1949 *Smicroplectrus jucundus* Heinrich, Mitt. München. ent. Ges. **35-39**: 121 (non Holmgren 1858).

Head moderately to rather strongly narrowed and rounded behind eyes; rather shallowly emarginate behind: on vertical region rather finely, and on temples, cheeks, inner orbits, and upper face moderately and densely punctate, confluent so just above antennae; epistoma coarsely and usually confluent punctate, often longitudinally rugose medially. Clypeus rather sparsely punctate, moderately so above, more finely so below; sharply delimited; distinctly but not strongly convex in basal half; usually narrowly rounded at apex. Malar space almost equal to distance between mandibular apices in female, distinctly less in male. Genal costa carinate but not laminate, except near junction with hypostomal; not angularly inflected, meeting hypostomal costa far behind mandibular base (Fig. 72); gena with no outer costa, evenly rounded in that position as seen from behind, almost straight-sided in lateral view: genal pit sometimes indicated. Hypostomal costa moderately raised, somewhat pointed below junction with genal costa. Second segment of maxillary palpi strongly swollen in female.

Antennae with scape weakly or rather weakly excised externo-ventrally, generally rather short: flagellum 23- to 27-segmented.

Pronotum with dorsal transverse furrow rather broad, shining; with epomiae of moderate strength; laterally moderately and densely punctate. Propleura densely and rather coarsely punctate. Mesoscutum much as described for *bohemani* Hlgr., but the punctation finer. Scutellum rather finely to moderately and not sparsely punctate above, usually more coarsely and densely so behind; usually strongly convex and not margined beyond scutellar fovea, but often less convex and more or less longitudinally impressed on disk. Mesopleura rather coarsely and densely punctate below, not much less so above, and with a shining speculum: sternaules weakly or moderately impressed: mesosternum finely and densely punctate, prepectus coarsely and densely so: epicnemial carina scarcely raised: mesolcus usually rather weakly impressed, greatly broadened in posterior half, more or less closed behind. Propodeum with costae of moderate strength or rather strong, and with costulae generally complete but occasionally absent; in greater part rugose, very finely to moderately so; sometimes rugose on greater part of area pleuralis, but area externa generally discretely, extremely finely punctate: area superomedia usually smooth, not delimited basally.

Gaster on tergites 1 and 2 mainly, and 3 at base, coriaceous-rugose; elsewhere strongly shining, moderately punctate on tergite 3, more and more finely so towards

apex. Petiolar segment as described for *quinquecinctus* Grav.; 1.4 to 2.2, usually about $1\frac{3}{4}$ times length of its greatest breadth.

Wings as described for *quinquecinctus* Grav., but radial cell sometimes relatively short in male.

Legs slender, as in *quinquecinctus* Grav.: tarsal claws generally (but not in Swedish specimen) rather strongly pectinate, with about four rather long, outwardly pointing comb-teeth.

Length 6 to $8\frac{1}{2}$ mm.

Differs in coloration from *quinquecinctus* Grav. as follows: the ivory-white purer, much less suffused with flavous. Pale colouring sometimes extending up orbits of upper face in female, and sometimes much more restricted on antenna. Pale apical marks of scutellum and metascutellum small or, more often, undeveloped in female, not developed in any male seen: no fulvous colouring on thorax. Leg colour much as described for *bohemani*, but male hind coxae on the average darker. Pale margins of tergites sometimes less extensive.

Described from the following material: IRELAND, Co. West Mayo, Old Head, 1 ♂, 3 ♀♀ (one the type), 28.v.1942, Co. Kildare, Sallins, 1 ♀, 17.v.1933, A. W. Stelfox; Co. Wicklow, Athdown, 1 ♂, 1.v.1933, J. F. Perkins; George's Bridge, 1 ♂, 1.v.1949, A. W. Stelfox; Co. Dublin, Glenasmole, 1 ♂, 23.v.1930, 2 ♂♂, 3.vi.1934, 1 ♂, 21.v.1939, 1 ♂, 20.v.1949, A. W. Stelfox, Dublin dist., 1 ♀, *ex* sawfly larva, em. c. 4.v.1932, G. C. Scott: SCOTLAND, Cairngorm Mts., Aviemore, 1 ♂, G. C. Champion (recorded as *jucundus* Hlgr., Bridgman, 1889: 434): BELGIUM, 1 ♀, coll. C. Wesmael: HOLLAND, Tilburg, 1 ♀, 4.iv.1941, coll. Adriaanse; Kijfhoek, 1 ♀, 17.v.1936, H. G. M. Teunissen (recorded as *jucundus* Hlgr., Teunissen, 1948): SWEDEN, Skåne, Skärålid, 1 ♀, 3.vii.1938, J. F. Perkins: FINLAND, Munksnäs, 1 ♀ *ex* Nematine sawfly larva, em. 5.iv.1940, E. Lindqvist: SWITZERLAND, Valais, Arolla, 1 ♀, *ex* larva *Amauronematus* sp. on *Salix*, em. iv.1936, R. B. Benson: GERMANY, Helzen, 1 ♂, 13.v.1943, R. Hinz; Bavaria, Haag-an-der-Amper, 5 ♂♂, 5 ♀♀, v.1948, Bodmann am Bodensee, 1 ♂, 25.iv.1949, G. Heinrich.

Holotype ♀ in British Museum (Natural History), kindly presented by Mr. A. W. Stelfox.

I first received this species in good series from Ireland from A. W. Stelfox: later, when a good Alpine series came from G. Heinrich, I was able to appreciate its chief characteristic. Heinrich's rich material of *Smicroplectrus* has been especially valuable in the elucidation thus far of this difficult genus.

Smicroplectrus jucundus Holmgren

1858 *Exenterus jucundus* Holmgren, *Svensk. Vet.-Akad. Handl.* 1: 227 (*non* Heinrich 1949).

1883 *Smicroplectrus jucundus* Thomson, *Opuscula Entomologica*, fasc. 9: 888.

1883 *Smicroplectrus costulatus* Thomson, *ibid.*: 888.

1913 *Smicroplectrus Bohemani* Roman (*pars*), *Ent. Tidskr.* 34: 128.

Head moderately transverse (more so than in *quinquecinctus* Grav.); slightly to moderately narrowed and strongly rounded behind eyes; deeply emarginate behind; in lateral view relatively short, and with vertical region rather strongly elevated (Fig. 68): shining, moderately, or in small specimens rather finely, and somewhat

densely punctate; with gena less densely and upper face much more densely so; epistoma usually distinctly alutaceous, rather coarsely to coarsely punctate, often in larger specimens rugulose-punctate (but not in lectotype): eyes very distinctly divergent in female but much less so in male. Clypeus almost impunctate below, sparsely punctate, with coarser and finer punctures, above; rather narrowly rounded apically; not strongly convex and often not deeply delimited, though with tentorial pits conspicuous. Malar space much longer than distance between mandibular apices in female, slightly shorter in male. Genal costa single, carinate; not strongly inflected, but meeting the hypostomal at less than a right angle (Fig. 71). Hypostomal costa distinctly and more or less laminately elevated, but not at all strongly so for a *Smicroplectrus*, its height being only about a quarter the distance of the junction with the genal costa from the base of the mandible. Mandibles with lower tooth contracted.

Antennae with scape very weakly excised externo-ventrally: flagellum normally 21- to 24-segmented, relatively short and thick, and very little attenuate to apex.

Pronotum with dorsal transverse shining impression narrow, rather deeply impressed, usually longitudinally costate; with epomiae sharp but rather weak; laterally moderately to rather coarsely and closely punctate above, rugulose-punctate below. Propleura rather densely and coarsely punctate. Mesoscutum rather weakly to moderately convex anteriorly, but rather regularly rounded, not so much flattened before the scutellum as in other species here described; with notaulices moderately or rather strongly impressed and often transcostate anteriorly; finely to moderately punctate, more finely and densely so anteriorly between notaulices; generally strongly shining but sometimes conspicuously alutaceous (it is so in type of *costulatus* Thoms.). Scutellum very strongly convex; moderately punctate above, weakly and irregularly rugose-punctate at sides, finely rugose behind; not or weakly margined to middle. Mesopleura above moderately, below coarsely punctate; sternaules broad and not deeply impressed: mesosternum densely and finely, prepectus densely and rather coarsely punctate: mesolcus usually not deeply impressed, very narrow till near hind end of sternum, where it is usually crossed by several transverse rugosities: epicnemial carina not elevated; but in female the prepectus is somewhat bent over ventrally. Propodeum with costae moderately strong; with dentiparal areae more or less weakly produced and with costulae complete or incomplete, sometimes scarcely indicated; finely coriaceous, but with the area pleuralis often distinctly finely punctate (it is so in type of *costulatus* Thoms.) and the area posteromedia rugose: area basalis not or scarcely delimited apically.

Gaster on tergites 1 and 2 mainly, and 3 and sometimes 4 at base, coriaceous; elsewhere alutaceo-punctate towards base of segments, at least in larger specimens, finely and sparsely punctate and shining towards apex. Petiolar segment 1.4 to 1.9 times length of its greatest breadth, but with the longer form predominating; with basal lobes generally obtusely pointed or almost rounded; with dorsal keels not very strong, usually indefinite in apical third. Tergite 2 with diagonal basal impressions indistinct.

Fore wings with stigma about 3.3 times, radial cell about 2.6 times as long as broad: hind wings with nervellus intercepted distinctly below middle: wings otherwise as described for *quinquecinctus* Grav.

Legs of normal, slender form in female, rather stouter in male. Hind tibiae with

spur relatively short even for this genus. Tarsal claws rather strongly but finely pectinate.

Length normally 6 to $8\frac{1}{2}$ mm. Length of small, pale form $4\frac{1}{2}$ to 6 mm.: flagellum may be 18- to 19-segmented.

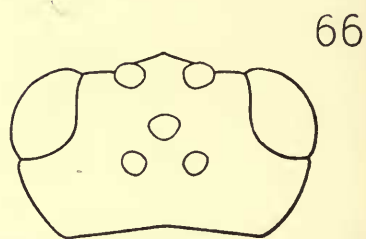
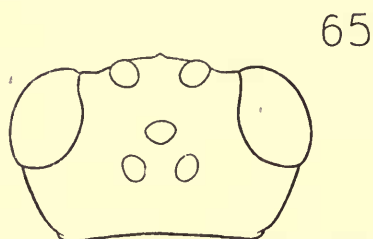
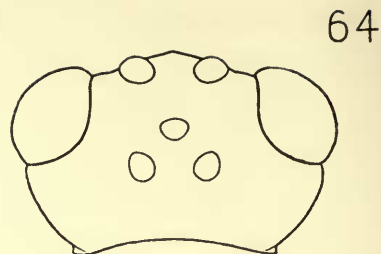
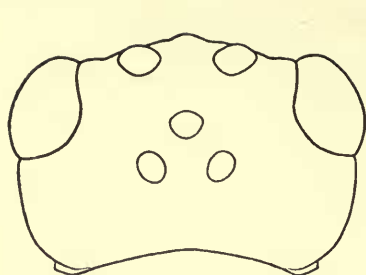
Differs in coloration from *quinquecinctus* Grav. as follows: ivory-white usually much purer, with very little flavous colouring. In female, the pale facial colour usually extends up the orbits of upper face almost to the top of the eye (though sometimes leaving a detached pale spot); but in male it is more restricted, often to a pair of incomplete bands on the orbits of the lower face and a median heart-shaped mark above the clypeus: pale colour of genae very restricted in male. In female the whole fore margin of the mesopleuron may be pale, and the pale markings of scutellum and metascutellum very restricted or entirely absent: in male the usual pale markings of the thorax are mostly or entirely absent, though the tegulae are stramineous in both sexes. The hind coxae and trochanters are fulvous in the English and black in the majority of continental specimens, flavous at apex: hind femora and tibiae fulvous to ferrugineous. Wing veins and stigma tending to be rather paler, especially in male. As described by Holmgren, tergites 5 to 7 of female may be almost wholly ivory-white.

Redescribed from the following material: ENGLAND, Surrey, Byfleet, *ex larva Amauronematus amplux* Kon. (Tenthredinidae) on *Betula* (larva vi.1947), 1 ♀ em. iv.1948, R. B. Benson; Herts., Brickett Wood, 2 ♂♂, 2.v.1949, 1 ♀, 23.v.1950, 1 ♀ em. iii.1945 *ex larva Amauronematus* sp. on *Salix*, R. B. Benson; Hunts., Woodwalton, 1 ♀, 21-23.v.1949, R. B. Benson; SWEDEN, Lapland, 4 ♂♂, 4 ♀♀, including 1 ♂, 2 ♀♀ of small, pale form 'ad Qvickjock (D. D. Boheman et Wahlberg), ad Umefors (ipse)' (Holmgren, 1858: 227); Lapland (no further data), 2 ♂♂, 4 ♀♀, including type to the description, under *jucundus* Hlgr. in Thomson coll. (one female a small, pale form), 1 ♀ (unique type of *costulatus* Thoms.): FINLAND, Pihtipudas, 2 ♀♀, 7.vi, 1 ♀, 9.vi.1945, Borgå, 1 ♀, Ivalo, 1 ♂, 2 ♀♀, Parikkala, 2 ♀♀, Haapajärvi, 1 ♀, 3.vi.1945, W. Hellén; Saana, 1 ♂, Nordman; Kouvola, 1 ♂, 24.v.1940, V. Karvonen; Tampere, P. Pirkkala, 1 ♀, 27.v.1934, A. Saarinen, Aitolahti, 1 ♀, 12.vi.1932, V. Saarinen; SWITZERLAND, Valais, Ferpècle, 5,000-8,000 ft., 4 ♂♂, 2 ♀♀, 14-27.vi.1935, R. B. Benson; GERMANY, Bavaria, Bodmann am Bodensee, 1 ♂, 25.iv, 1 ♀, 23.v.1949, G. Heinrich.

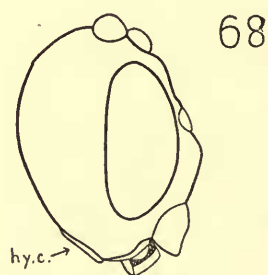
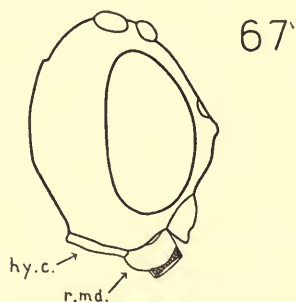
Through the kindness of Dr. Kjell Ander I was able in 1947 to take the Thomson material from Lund, and make direct comparison with the Holmgren material in Stockholm. A. Roman's lectotype is a female specimen taken by P. Wahlberg.

Records of *jucundus* from Belgium, Holland, Scotland, and the northern midlands of England are, in this paper, referred to other species. The European distribution as now known to me is arctic and sub-arctic, Alpine and sub-Alpine, and both sides of London in southern England. How much importance can be attached, in the present state of our knowledge, to negative evidence from the middle European plains remains to be seen; but R. B. Benson points out to me that this corresponds with the Siberian type of distribution (see Benson, 1950).

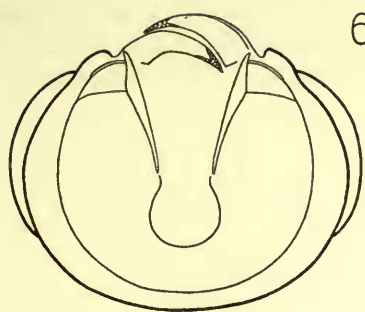
Three female and three male specimens from Mt. Rainier, Washington, U.S.A., taken by H. K. Townes and determined by him as *albilineatus* Walsh, are extremely



FIGS. 63-66. Head from above of Fig. 63. *Smicroplectrus quinquecinctus* Grav. ♀. Fig. 64. *Smicroplectrus quinquecinctus* Grav. ♂. Fig. 65. *Smicroplectrus excisus* sp. n. Fig. 66. *Smicroplectrus perkinsorum* sp. n.



FIGS. 67-68. Head in dextro-lateral view of Fig. 67. *Smicroplectrus perkinsorum* sp. n. Fig. 68. *Smicroplectrus jucundus* Hlgr. *hy.c.* = hypostomal costa, *r.md.* = right mandible.



69



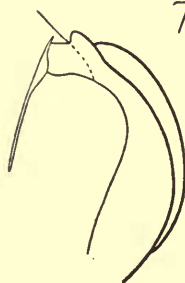
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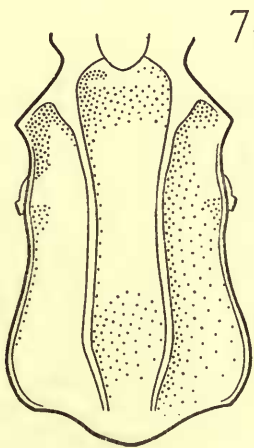


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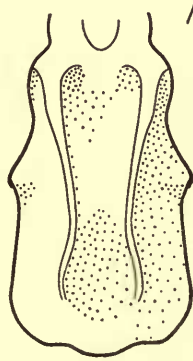


73

FIGS. 69-73. Head in hind view of Fig. 69. *Smicroplectrus quinquecinctus* Grav. Fig. 70. *Smicroplectrus trianguligena* sp. n. Fig. 71. *Smicroplectrus jucundus* Hlgr. Fig. 72. *Smicroplectrus heinrichi* sp. n. Fig. 73. *Smicroplectrus clementi* sp. n. Figs. 69-72 to same scale, Fig. 73 larger.



74



75

FIGS. 74-75. Petiolar segment of Fig. 74. *Smicroplectrus quinquecinctus* Grav. Fig. 75. *Smicroplectrus perkinsorum* sp. n.

similar to the European material on which the description of *jucundus* was based, and agree with the description in all respects. I do not, however, propose the placing of *albilineatus* Walsh in synonymy; but leave the problem with W. R. M. Mason, for reasons that will emerge when his revision of the nearctic species is published.

KEY TO PALAEARCTIC SPECIES OF *SMICROLEPTETRUS* THOMSON

1. Male antennae pale-banded: female unknown: Japan . . . *quadriceps* Uchida
 Female known, and male of all but two species: antennae not pale-banded . . . 2
2. Hypostomal costa exceptionally strongly laminate (to be seen in Fig. 67), acute-angled or almost so below junction of genal costa, which is not laminate: gena falling to a deep, longitudinal pit beside hypostomal costa, bounded externally by a sharp angulation of the gena: head strongly transverse (Fig. 66): fore wings with stigma and radial cell relatively broad (see description): petiolar segment relatively elongate, with basal lobes rounded (Fig. 75), or at any rate of similar shape *perkinsorum* sp. nov.
 If the gena has an outer costa or is angulate or strongly rounded in that position, the genal costa is laminately elevated: head not so transverse except in non-spurred species (couplet 7): in other respects not as above 3
3. Genal costa carinate, but not laminate, neither double nor angled in position of outer costa: no distinct genal pit 4
 Genal costa moderately or strongly laminate, not as in the two following species (Figs. 71 and 72) 5
4. Head, notably eyes (viewed laterally), short (Fig. 68, cf. Fig. 67), with vertical region rather strongly elevated: genal costa not strongly inflected, but meeting hypostomal costa at distinctly less than a right angle (Fig. 71): hypostomal costa weakly elevated, the height being only about a quarter the distance of the junction of the genal costa from mandibular base . . . *jucundus* Hlgr.
 Head not so short (similar to Fig. 67), nor vertical region thus elevated: hypostomal costa moderately elevated, met by genal costa at nearly a right angle far behind mandibular base (Fig. 72) *heinrichi* sp. nov.
5. Gena with no outer costa, but strongly rounded in that position: genal costa moderately laminate 6
 Gena with an outer costa, at least in part, or sharply angulate in that position . . . 8
6. Head less transverse than in *perkinsorum* sp.n. (Fig. 66): genal costa normally curved, meeting hypostomal a moderate distance behind mandibular base, about as in *quinquecinctus* Grav. (Fig. 69): hind tibia with the minute spur characteristic of the genus: [hind knees not conspicuously pale]
 *bohemani* Hlgr.
 Head more transverse than in *perkinsorum* sp.n. (Fig. 66): genal costa meeting hypostomal much nearer mandibular base: hind tibia without the minute spur characteristic of the genus 7
7. Genal costa not bulging outward as in alternate: petiolar segment about $1\frac{1}{2}$ times

- length of its greatest breadth: basal and disco-cubital veins (as in most species) nearly parallel: [hind knees conspicuously pale] *sibiricus* sp.n.
- Genal costa bulging very distinctly outward (Fig. 73): petiolar segment about twice length of its greatest breadth: basal and disco-cubital veins distinctly divergent *clémenti* sp. n.
8. Genal costa moderately raised: genal pit (Fig. 70) triangular, usually longer along hypostomal costa than its length along genal: [differs from *quinquecinctus* Grav. in having the gaster mainly shining, and from *excisus* sp.n. in the shapes of the antennal scape and hind metatarsi] *trianguligena* sp.n.
- Genal costa strongly laminately raised: genal pit distinctly broader along genal costa than its length along hypostomal (Fig. 69) 9
9. Scape of normal form, weakly excised externo-ventrally (Fig. 60): legs of normal slender form, the hind metatarsus about 7 times length of its greatest breadth in inner side view in female, 6 to 7 times in male: gaster mainly alutaceo-punctate, more or less matt *quinquecinctus* Grav.
- Scape strongly convex above and very deeply excised externo-ventrally, its ventral being less than half its dorsal length (Fig. 61): legs relatively stout, the hind metatarsus about $5\frac{1}{2}$ times length of its greatest breadth in same view (Fig. 62): gaster mainly strongly shining *excisus* sp. n.

Genus *EUDIABORUS*, gen. n.

Diaborus Förster, Thomson 1883 *non* Woldstedt 1877.

This genus was diagnosed by Förster (1868) without included species. It was taken up by Thomson (1883); and Roman (1939) showed that it was the genus that Förster actually had. However, as has been recorded earlier in the present paper, Woldstedt had, in the meantime (1877), included two species neither of which belongs to the genus in question; and *Diaborus* has to take *sedulus* Woldst. as type, by designation of Viereck 1912. To fill the lacuna the present writer has (p. 315 above) proposed *Eudiaborus* as a new genus, taking as type the best-known species *pallitarsis* Thoms.

Thomson included four species he described as new; and a fifth, with normal third valvulae and seemingly attached to conifer woods, which he interpreted as *lituratorius* L. It is, however, evident that Thunberg (1822, as recorded by Roman, 1912), Zetterstedt (1840), Holmgren (1858), Brischke (1878), and later Schmiedeknecht (1911) had more than one species mixed under the name *lituratorius*.

Gravenhorst (1829) described a species, *Tryphon scalaris*, based on males; and a second form, based on females, two with similar data, which he called *Tryphon sexlituratus*. He placed *scalaris*, which had page priority, as questionably the male of *sexlituratus*; and placed *sexlituratus* doubtfully in synonymy with *lituratorius* L. Pfankuch (1906) associated these Gravenhorst species with the present genus, and placed both in synonymy with *lituratorius*.

Roman (1909) described an arctic species *glutiniatus*, with a variety *inversus* which he later (1931b) recognized as a good species. Gregor (1937) described a new form *moravica*, which he placed as a subspecies of *lituratorius*; but he added that it might

well be a good species. The above I believe to be the sum total of European species described.

Roman (1932), in the course of a revision of the types in the collection of the Linnean Society of London, showed that *lituratorius* L. does not belong to this tribe at all, but is actually *Hypsantyx impressus* Grav. He put forward *scalaris* Grav. as the first available name for *lituratorius* auctt.

Later (1939) he revised the Thomson species. He considered *lituratorius* Thoms. as an atavistic form of *lituratorius* auctt. with normal third valvulae, and added *filipalpis* Thoms. to this aggregate. He also placed *nigrifrons* Thoms. in synonymy with *pallitarsis* Thoms. I do not think that these interpretations will be upheld; for J. F. Perkins has, in the British Museum collection, arranged provisionally under the four Thomson species, forms that accord with Thomson's diagnoses and which do seem to be good species. Roman's identification of *pallitarsis* Thoms. as a species to be found in abundance parasitizing *Nematus* (*Pteronidea*) *ribesii* Scop. was, however, helpful.

Now Schmiedeknecht was evidently unable to comprehend those parts of Thomson's monograph written in the Swedish language. He merely translated (1911) Thomson's Latin diagnoses of the four new species; and he erected a barrier to further understanding of the genus by giving a key to species, according to which the lower face should not be wholly yellowish-white except in the female of '*lituratorius*'. This was completely contrary to what Thomson wrote in his remarks on the genus. It is clear that *lituratorius* or, since 1932, *scalaris*, has come simply to signify any *Diaborus* Thoms. that any student of Ichneumonidae could not place in any of the other described species.

The genus requires complete revision with the aid of larger material than has been available and, when this has been done, the Gravenhorst and Thomson types should again be examined. I do not, however, see any reason to identify *scalaris* Grav. with *lituratorius* Thoms. *non* L. I think it far more likely to be *pallitarsis* Thoms.; and it should not stand in any publication as a separate species without other interpretation.

In order to make Thomson's introduction to the genus (p. 888) more widely available to students of Ichneumonidae, I give below an English translation of it. I do so by courtesy of Håkan Ohlssons Boktryckeri, Lund; and Dr. Kjell Ander has very kindly checked it for me, and corrected it in one particular. I have thought it better to give as nearly as possible a literal translation, so that the English words can be compared with those used by Thomson.

'Note. The following colour-pattern is common to all species: the face together with the cheeks and mouth-parts, a line on the pronotum in front of the tegula and one on the lower margin, a mark on the scutellum and also the under side of the antennal scape are white-yellow; almost white are the coxae and trochanters of the fore legs and also the median triangular marks on the hind margins of the dorsal segments, the femora are more reddish, the tarsi and tibiae sometimes of the same colour, the under side of the breast is in the female almost without exception yellowish and closely pilose. All the specimens of *D. frontalis*, which were found on a willow-bank at Örtofta, bred from *Nematus Westermanni* show no variation in the yellow-white orbits of the frons nor in the almost rose-red hind margin of the second dorsal segment,

wherefore I believe that the colour in these species is constant and can be used as a basis for species-determination.'

Eudiaborus glutiniatus Roman

FINLAND, Kuusamo, Paanajärvi, Ruskeakallio, bog behind cliff, 1 ♀, 9.viii.1935, G. J. K.

I give a figure of the under side of the apex of the female gaster (Fig. 76) to illustrate the peculiar glutiniae (third valvulae) in this species.

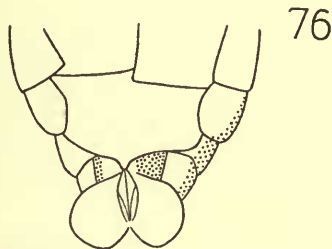


FIG. 76. Apical segments of gaster, from beneath, of *Eudiaborus glutiniatus* Roman, illustrating especially the glutiniae (third valvulae).

A. Roman told me he regarded this species as not uncommon in the Arctic, but that he did consider his capture of it at about 62° latitude as remarkable.

Mason (1951, April: 228) has now recorded this as a North American species.

Eudiaborus boreoalpinus sp.n.

1940 *Diaborus nigrifrons* var. *pallitarsis* Hedwig, Z. Ent. Breslau, 18 (4) (non Thomson 1883).

Head (Fig. 77) more nearly cubical than in *pallitarsis* Thoms. and other palaearctic species seen; seen from above about two-thirds length of its greatest width across eyes, and sometimes as much as 1.5 times eye length behind eye; only slightly narrowed behind eyes till near hind margin, but slightly more rounded in male; deeply emarginate behind: on vertical region, temples and upper genae rather coarsely but quite discretely punctate, on lower genae and upper face much more closely so; lower face coarsely and, in part, confluent punctate on an alutaceous background, sometimes a little smoother medially. Clypeus sparsely beset with punctures, fine to rather coarse; fairly sharply and not deeply delimited; more or less weakly convex and usually rather narrowly rounded apically. Hypostomal costa not so strongly bent outwards as in *pallitarsis* Thoms.; rather evenly raised to where met by genal costa, a little farther behind mandibular base than width of malar space. Malar space about equal to distance between mandibular apices, or a very little wider.

Antennae with scape of moderate proportions, rather more elongate than in *pallitarsis* Thoms., and with a rather sharp ventro-lateral excision (but some variation in this): with flagellum rather slender, 24- to 28-segmented.

Pronotum with dorsal transverse furrow deeply and sharply impressed; with

epomiae of moderate strength, sometimes sharp; laterally moderately and rather closely punctate above, rugose below. Propleura rather closely punctate, moderately so behind, more coarsely in front. Mesoscutum moderately to strongly convex, but not rising sharply from pronotum; with notaulices rather short, rather weakly or moderately impressed; moderately and unevenly punctate. Scutellum usually weakly convex; finely and often rather sparsely punctate above, moderately so on sides; not margined far beyond the broad scutellar fovea. Mesopleura moderately and closely punctate, more coarsely and sparsely so in middle: sternaules broad, shallowly impressed: mesosternum less concave than in *pallitarsis* Thoms., rather finely and very closely punctate, prepectus moderately and closely so: epicnemial carina almost rectilinear between notaulices, very little incised medially: mesolcus not deeply impressed, more or less closed behind. Propodeum in greater part finely rugose in female, more coarsely so in male; with area externa finely or rather finely punctate and conspicuously shining, and area pleuralis moderately and closely punctate; with costae including costulae sharp and of moderate strength: area supero-media distinctly longer than broad, emitting costulae about in middle, not or not strongly delimited basally.

Petiole segment (Fig. 78) 1.4 to 1.5 times length of its greatest breadth in female, 1.5 to 1.7 times in male, unusually elongate and regularly explanate for this genus; with basal lobes weak or scarcely apparent; laterally weakly margined in female, more strongly so in male; with dorsal keels in female weak, distinct for about half length of segment, longer and stronger in male; dorsally coriaceous-rugose, smooth at mid apex. Remainder of gaster shining: tergite 2 with diagonal basal furrows no more than moderately impressed, moderately and closely though shallowly punctate between them: gaster more and more finely punctate towards apex. Female hypopygium bent at a definitely obtuse angle, and sharply keeled mid-ventrally beyond the bend (cf. *pallitarsis* Thoms. in which it is bent at about a right angle and is not thence sharply keeled). Female third valvulae of the same general type as in *pallitarsis* Thoms., but more elongate, less broad, and less excavate beneath.

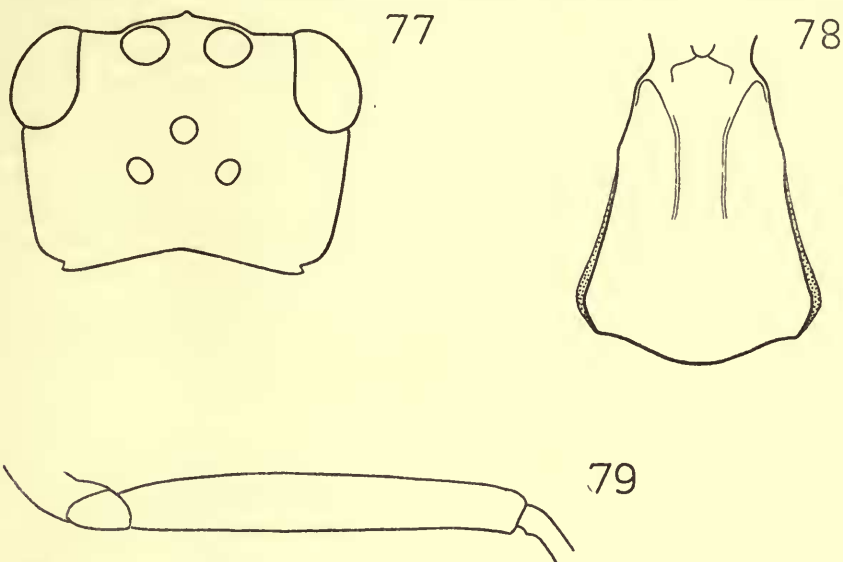
Fore wings with basal and disco-cubital veins not nearly parallel: with areolet always distinctly petiolate; with nervus parallelus emitted well below middle of brachial cell: radial cell 2.6 to 2.9 times length of its greatest breadth. Hind wings with nervellus antefurcal and intercepted far below middle.

Legs elongate and slender; notably the hind femora (Fig. 79), which are much more so than in *pallitarsis* Thoms.: the males, however, less characteristic in this respect. Tarsal claws regularly and rather strongly pectinate in female, but with much shorter comb-teeth in male.

Length 6 to 10 mm.

Female. Head black, with the following parts pale, bright flavous: mandibles except at apex, clypeus, lower face except for a median mark in upper part, and genae very broadly, the pale colour crossing the hypostomal costa: palpi more fulvous. The pale colour does not extend up the inner orbits above the top of the antennal sockets: the region of the clypeo-frontal suture is more or less distinctly dark-marked between the tentorial pits. Antennae ferruginous, merging to black at base above, paler below; with scape pale, bright flavous below; with pedicellus similar, or usually at

least conspicuously pale below. Thorax and propodeum black, with the following bright flavous: lower angle of pronotum and margin some way forward thereof, humeral angle and margin well forward thereof, propleura, marks below fore and hind wings, rather small mid apical marks of scutellum and metascutellum, and lateral flanges of scutellum: tegulae stramineous, scarcely suffused flavous: mesosternum not pale-marked. Legs rufous, notably the hind tibiae, which are not at all blackened, or only very weakly so at extreme apex; with fore and mid femora and fore tibiae paler



FIGS. 77-79. *Eudiaborus boreoalpinus* sp.n. Fig. 77. Head from above. The head is tilted farther backward than in corresponding figures of species of other genera, otherwise the hind emargination would appear deeper. Fig. 78. Petiolar segment. Fig. 79. Left hind femur in sinistrolateral view.

in front and hind trochanters below: fore and mid coxae, trochanters and trochanterelli flavous; with those of mid leg extensively, and fore coxae on outer side, rufous-marked: tarsi somewhat darkened at apex. Wing veins pale ferrugineous; with axillary sclerites pale flavous: stigma pale ochreous. Gaster black above, with sides and venter flavous: tergites with pale flavous triangular marks at mid apex, increasing in size from 1 to 5; and usually with very fine pale hind margins: third valvulae darkened at apex.

Male differs as follows. Pale coloration distinctly not reaching level of top of antennal sockets, and on gena much more restricted, not nearly reaching hypostomal costa: lower face with a broad, median black band: clypeus broadly black basally between tentorial pits. Thorax with tegulae and upper margin of pronotum coloured as in female, but other pale markings absent or much reduced: in particular, the scutellum is not pale-marked at mid apex except obscurely in one specimen, and the propleura are black. Legs with coxae, trochanters and trochanterelli blackish in place of rufous, and rather more extensively so, the fore trochanters blackish-marked

above: mid and hind femora sometimes blackish below near base: hind tibiae at apex usually, and hind tarsi always, extensively darkened. Pterostigma sometimes darker. Triangular pale marks sometimes undeveloped on tergites 1 and 2: venter blackish in part.

Described from the following material. SCOTLAND, Inverness-shire, Cairngorm Mts., 3,000 ft., 1 ♀, 18.viii.1925, F. C. Best (type): SWEDEN, Jemtland, 1 ♀; Lapland, 1 ♀, 25.vii, C. Boheman: SWITZERLAND, Engadine National Park, Il Fuorn, La Drosa, 1 ♀, 10.viii.1921, Ch. Ferrière: AUSTRIA, Styria, Kreuzkogel southern slope, 1,800 m., 1 ♂, 7.viii.1950; Niedere Tauern, 2,000 m., 1 ♀, 21.viii.1950, G. Heinrich: GERMANY, Bavaria, Allgäu, Osterachtal, 1,600 m., 2 ♂♂, 1 ♀, 8.viii.1949, G. Heinrich; Silesia, Glatzer Schneeberg, 1 ♂, 2.viii, 1 ♀, 11.viii.1921, K. Hedwig (recorded as *nigrifrons* Thoms. var. *pallitarsis* Thoms. as determined by A. Roman, Hedwig 1940).

Holotype ♀ in British Museum (Natural History).

In the female sex, this species is very distinctive in the long, almost straight-sided head; the ventrally almost straight, scarcely incised epicnemial carina; the shape of the petiolar segment; the long, slender hind legs with slender femora and clear red tibiae, which are not blackened or scarcely so at extreme apex; and the black mesosternum. The male is more weakly characterized.

This species is of particular interest on account of the distribution, which is of the wide Arctic type (Benson, 1950: 93, 95).

Further material seen: see supplement, p. 454 below.

Genus *CTENISCUS* (Haliday MSS.), Curtis, Thomson

1832 *Tryphon*, subgenus *Cteniscus* (Haliday MSS.) Curtis, *British Entomology*, 9: 399.

1838 *Tryphon*, subgenus *Cteniscus* Haliday, *Ann. Mag. nat. Hist.* (1) 2: 113.

1883 *Cteniscus* Thomson, *Opuscula Entomologica*, fasc. 9: 881-882.

I began my work on this genus with a study of the two Haliday species that had been proposed as genotypes. It was soon found necessary, not only to redescribe *curtisii* Hal., which has been very little understood, but also to distinguish it more critically from the species most closely allied to it. This work was then extended to become a revision of most of the European 'black-bodied' species of the genus.

Among the red-bodied species, Roman (1913, 1931) has pronounced a number of the forms, described as species by Holmgren and others, to be no more than races or mere colour varieties of *flavomaculatus* Grav. This synonymy, which has been largely followed by the present and other authors, was, however, carried too far. Thus, the majority of forms have the head rather strongly punctate and not narrowed behind the eyes, whereas *pumilus* Hlgr. and *limbatellus* Hlgr. have the head very finely punctate and shining, distinctly narrowed behind the eyes. Other good structural differences may be found, to separate forms at present distinguished only by colour characters. A. Roman rearranged the collection of Swedish Ichneumonidae in the Stockholm museum, but he did not omit to select lectotypes of the forms described by Holmgren.

Cteniscus hofferi Gregor

1858 *Exenterus succinctus* Holmgren, *Svensk Vet.-Akad. Handl.* **1**: 230 (non Gravenhorst 1829).

1914 *Cteniscus gnathoxanthus* var. Roman, *Ark. Zool.* **9** (2): 16 (non Gravenhorst 1829).

1937 *Cteniscus hofferi* Gregor, *Festschrift E. Strand, Riga*, **2**: 416-417.

Head moderately narrowed and scarcely rounded behind eyes; rather deeply and almost angularly emarginate behind: shining, with vertical region and temples moderately, and cheeks generally finely punctate; lower face more coarsely, and upper face medially also more densely so, obsoletely alutaceous. Clypeus sparsely punctate; rather narrowly rounded apically; rather deeply delimited, with tentorial pits conspicuous; strongly convex in basal and shallowly impressed in apical half: in male it is generally more evenly convex, and very shallowly impressed before the projecting apex. Malar space shorter, in male much shorter, than distance between mandibular apices. Hypostomal costa slightly raised to where it is met by genal costa, at a strongly acute angle a good way behind mandibular base. Upper mandibular tooth longer than lower.

Antennae with scape rather short, moderately excised externo-ventrally: flagellum normally 27- to 31-, but in Holmgren's small northern specimen only 22- segmented, tapering gradually to apex.

Pronotum with dorsal transverse furrow narrow and sharply impressed; with epomiae usually weak; shining and moderately punctate above, more or less longitudinally rugose below. Propleura shining and moderately punctate, anteriorly strongly rugose. Mesoscutum rising sharply from pronotum, rather strongly convex; with notaulices short but strongly impressed, giving it a distinctly trilobed appearance; discally often rather coarsely punctate, peripherally more finely so; between notaulices generally very weakly rugose. Scutellum generally rather strongly convex; sparsely punctate; margined scarcely beyond scutellar fovea. Mesopleura closely and rather strongly punctate, much more sparsely so above; with a shining speculum: sternalices very superficial: mesosternum towards mid line more sparsely and irregularly, almost rugose-punctate, smooth and shining behind: prepectus strongly punctate: epicnemial carina very slightly elevated: mesolcus moderately impressed, narrow anteriorly and widened posteriorly, scarcely closed by the transverse rugosities behind. Metascutellum smooth and rather prominent. Propodeum shining and very weakly punctate above, with the area pleuralis much more clearly and densely punctate; with costae including costulae moderately strong, in male strong and sharp: area basalis not delimited apically: area superomedia usually longer than broad, emitting costulae before middle.

Gaster stoutly spindle-shaped in female, behind petiolar segment almost parallel-sided in male: petiolar segment very obscurely rugose, but with distinct longitudinal rugosities by apical angles and smooth and very shining in mid third of hind margin: remaining segments smooth and shining. Petiolar segment 1.0 to 1.3 times length of its greatest breadth in female, 1.3 to 1.7 times in male: rather broad at the base, but without basal lobes; moderately explanate and strongly margined; with keels distinct for more than half length of segment, stronger and more nearly percurrent in male; with furrows between keels and margins more or less developed; with a strong

lateral furrow leading to the glymma: spiracles situated well before middle, not prominent. Tergite 2 with thyridia distinct but narrow in female, broader and more conspicuous in male; with diagonal basal impressions distinct in male, but superficial and ill-defined. Female hypopygium almost pointed apically: third valvulae normally not nearly reaching apex of tergite 8.

Fore wings with basal and disco-cubital veins not nearly parallel; with areolet very broad and shortly petiolate; with nervus parallelus emitted in middle of brachial cell. Hind wings with nervellus strongly antefurcal and intercepted far below middle.

Legs with the black hind tibiae relatively thick (Fig. 81). Claws of all tarsi strongly pectinate.

Length 7 to $11\frac{1}{2}$ mm.

Female. Head black, with the following parts ivory to pale flavous: genae except near costa, lower face except for a median mark in upper part, whole of clypeus, often a small orbital spot just below level of median ocellus, and most of mouth-parts except mandibular apices. Antennae ferrugineous; basally darker, especially above. Thorax and propodeum black, with the following parts stramineous to bright flavous margined with fulvous: humeral angle of pronotum and upper margin some distance forward thereof, whole of its lower margin at sides and a median anterior mark (these two sometimes continuous), propleura except anteriorly and near mid line, tegulae, line below fore wings, generally two pairs of small marks on prepectus, another before bases of mid coxae, large quadrangular apical mark and lateral extensions of scutellum, mark below hind wings extending down hind margin of mesopleura, and meta-scutellum. Legs with fore and mid coxae, trochanters and trochanterelli stramineous to flavous, suffused fulvous: fore and mid tibiae and tarsi, all femora, and hind coxae and trochanters fulvous: hind tibiae and tarsal segments almost black, fulvous at base, and often paler beneath; hind tibiae with a pale sub-basal mark. Wings slightly infumate, with veins and stigma fuscous to ferrugineous, the veins basally flavous and the stigma basally luteous. Gaster black above, the tergites having pale apical and lateral margins; stramineous to fulvous below, with black marks on some sternites, but hypopygium pale: thyridia castaneous.

Male differs from the female as follows. Head with the pale parts more whitish stramineous, but with the clypeus in apical half generally suffused fulvous. Antennae deep ferrugineous, almost black; scape pale flavous beneath, pedicellus and annellus pale beneath, postannellus pale at base and apex and next few segments at apex. Lower margin of pronotum forming a complete pale collar. Hind coxae and trochanters paler. Pale margins of tergites 1-3 triangularly broadened.

Redescribed from the following material: IRELAND, Co. Waterford, Dungarvan, Maghgiha, 1 ♀, 17.viii.1928; Co. West Mayo, Old Head, wood, at larva of *Croesus* on *Betula*; Co. Wicklow, Glending Wood, 1 ♀, 15.ix.1938; Leitrim Barracks (Glen of Imaal), 1 ♂, 11.viii.1940; Co. Dublin, Slade Brook, ex larva of *Hemichroa crocea* Geoffr. (larva 21.ix.1941), 1 ♂ em. 6.viii.1942, A. W. Stelfox: ENGLAND, unlocalized, 1 ♂ (under *curtisii* Hal.), T. Desvignes coll.: BELGIUM, unlocalized, 1 ♂, 5 ♀♀, C. Wesmael; Sichem, 3 ♀♀, 14-15.ix.1886; Verrewinkel, 1 ♂, 15.ix.1848; Sysseele, 1 ♀, 22.ix.1876; Carlsbourg, 1 ♀, 9.ix.1898; Severin, 1 ♀, 28.ix.1897, J. Tosquinet: SWEDEN, Skåne, Skärålid, 1 ♂, 4.ix.1938, G. J. K.; Västerbotten, Tavelsjö, 1 ♀, 4.ix, C. Boheman

(recorded as *succinctus* Grav., Holmgren 1858): FINLAND, Lojo, 1 ♀, 1934, R. Krogerus, 1 ♀, W. Hellén; Karislojo, 1 ♀, R. Forsius: GERMANY, unlocalized, 1 ♀, Ruthe coll. (under *Tryphon sexlituratus* Grav.); Göttingen, 1 ♀, 13.ix.1946; Hannover, 1 ♀, 13.ix.1948, R. Hinz: AUSTRIA, Pettenbach (S. of Wels), 1 ♀, 7.x.1941, Czerny: ITALY, Piedmont, 2 ♀♀, 1859, O. Sichel.

Additional material seen: HOLLAND, Brummen, 3 ♀♀, vii, round *Nematus* larvae on *Sorbus aucuparia*, Snellen van Vollenhoven (1872: 167, recorded as *Exenterus succinctus* Grav.).

Roman (1914) interpreted the unique female in the Holmgren collection as an extraordinarily white variety of *Ct. gnathoxanthus* Grav. In later years he arranged it in the Swedish collection of the Stockholm museum under *breviventris* Thoms., which species is, however, placed otherwise in the present paper (p. 437).

Since going to press I have, through the kindness of Dr. Z. Bouček, received the type of *hofferi* Greg. on loan. I had no real doubt that the species was correctly identified, but there were certain discrepancies in an otherwise good original description. It has been my frequent experience that subsequent micrometer measurement belies an estimate of the length to breadth of a structure made by eye; and the same difficulty must affect other authors, for in this specimen the length to greatest breadth of both area superomedia and petiolar segment are 1:1.3 to the nearest 0.1. As suspected, 'Weiss sind . . . Hüften und Trochanteren II. und III.' was a *lapsus* for ' . . . I. und II.' The head of the type had been lost, but the thorax and abdomen and their appendages conform to my description and agree closely with specimens from which it was made.

Biology. As recorded above, A. W. Stelfox took a parasitized larva of *Hemichroa crocea* Geoffr. on 21 September 1941, and bred an adult male parasite, which emerged in early August the following year. He also found the adult female parasite investigating *Croesus* larvae on birch.

R. Hinz took an adult female on 13 September 1948, and sustained it with sugar water. It attacked a larva of *Arge ustulata* L. but laid no egg. It attacked a larva of *Hemichroa crocea* Geoffr., and so wounded it that body fluid oozed out, but again no egg was laid. When presented with larvae of *Croesus septentrionalis* L. and *latipes* Vill., it oviposited on them without further ado on the writing-table. The main breeding experiments were carried out, however, with three species of *Nematus*.

The procedure prior to oviposition was observed as follows: the ovipositor is bent free from the sheaths, and the egg is pushed to the tip of it, while pulsating movements of the abdomen take place; the ovipositor then resumes the resting position, and the insect is prepared for oviposition. The egg has no real stalk, but a crochet apparatus; and is affixed between the first and second or second and third body segments of the host. Eggs were laid at intervals of about 10 minutes, sometimes longer. Thus on 19th September 1948, 8 eggs were laid between 11 a.m. and 12.15; while on the 15th, 10 eggs were laid altogether.

Eggs were obtained on 25 larvae of *Nematus (Pteronidea) pavidus* Lep., on 16 of *N. (Pt.) miliaris* Panz., and on 11 of *N. (Pt.) melanocephalus* Hart. The larvae hid away in preserving tins containing some sand. From the *pavidus* larvae, 24 cocoons were obtained; but these were only found to contain remains of the host larvae. The

same kind of result was obtained with the *miliaris*. By contrast, the batch of *melanocephalus* gave 10 cocoons; and from these there were hatched in due season 2 adult females of the sawfly and 8 adult males of the *Cteniscus*. Considering the difficulty of obtaining the right conditions for rearing sawfly larvae, Herr Hinz does not wish to base any facile conclusions on these results; but he observes that the *melanocephalus* is the largest larva of the three *Nematus* species used.

***Cteniscus lineiger* Thomson**

1858 *Exenterus exstirpatorius* Holmgren, *Svensk Vet.-Akad. Handl.* 1: 238 (non Gravenhorst 1829).

1883 *Cteniscus lineiger* Thomson, *Opuscula Entomologica*, fasc. 9: 894.

Head moderately narrowed and rounded behind eyes; about as long behind eyes as eye length, seen from above, in female, shorter in male; shallowly emarginate behind: on vertical region, temples and upper face moderately and rather densely punctate; on sides of lower face less densely so, and on genae broadly much more finely and sparsely punctate: epistoma rather coarsely punctate, obsoletely alutaceous. Clypeus somewhat closely beset, mostly with moderate punctures, closely alutaceous near mid apex; sharply delimited basally; moderately convex in basal and broadly and shallowly impressed in apical half; moderately rounded at apex. Malar space about three-quarters distance between mandibular apices. Hypostomal costa very slightly and evenly raised: sides of proboscideal fossa bent strongly outwards.

Antennae with basal segments very much as in *Ct. gnathoxanthus* Grav. (see description, p. 441 and Fig. 83): flagellum 24- to 27-segmented.

Pronotum with dorsal transverse furrow moderately impressed, coarsely transcarinate; with epomiae sharp but short; laterally moderately punctate above, extensively longitudinally rugose below. Propleura moderately and closely punctate. Mesoscutum rising sharply from pronotum, strongly convex; with notaulices rather short, moderately impressed; for the most part shining and finely to moderately punctate, but between notaulices closely punctate and obsoletely rugose. Scutellum weakly convex, and to some extent buckled discally; not margined much beyond scutellar fovea; very finely punctate at sides and behind, almost impunctate discally. Mesopleura rather coarsely and closely punctate below, but shining between the punctures, not much more finely punctate above, and with a small, shining speculum: sternaules moderately and rather sharply impressed: mesosternum rather finely to moderately and closely punctate, prepectus strongly so: epicnemial carina slightly but distinctly elevated: mesolcus sharply impressed and narrow, broadened posteriorly, partly closed behind. Propodeum very finely punctate and shining, in part obsoletely rugose, with area pleuralis not much less finely punctate in greater part, distinctly rugose below; with costae sharp and of moderate strength: area postero-media with a percurrent median keel: area superomedia distinctly broader than long, distinctly delimited basally.

Gaster stoutly spindle-shaped in female, behind petiolar segment almost parallel-sided in male: petiolar segment in greater part distinctly though usually weakly rugose, smooth to a greater or lesser extent near mid apex: tergite 2 coriaceous at

base between thyridia: remainder of gaster smooth and shining. Petiolar segment 1.1 to 1.3 times length of its greatest breadth in female, 1.3 to 1.5 times in male; rather strongly explanate and strongly margined; without basal lobes, but with spiracular tubercles rather prominent; with dorsal keels distinct for rather more than half length of segment, and with a distinct median pit just behind them. Tergite 2 with thyridia narrow and inconspicuous in female, broader in male but less so than in male of *hofferi* Greg. Female hypopygium blunt-pointed at apex: third valvulae rather small, but stout and densely hairy, extending a little beyond apex of tergite 8.

Fore wings with basal and disco-cubital veins more nearly parallel than in *hofferi* Greg., and both more nearly vertical; with areolet broad and shortly petiolate; with nervus parallelus emitted below middle of brachial cell: stigma and radial cell relatively broad, the latter 2.2 to 2.6 times length of its greatest breadth (in *hofferi* 2.6 to 3.0 times). Hind wings with nervellus antefurcal, intercepted well below middle.

Legs relatively stout, stouter than in *rufonotatus* Hlgr., but not so strongly expanded in apical quarter as in *hofferi* Greg. Tarsal claws with pectination of moderate strength, not extending to apex.

Length 6 to 8 mm.

Head coloured as in *hofferi* Greg., but lower face with a complete median black band, and genae not pale to so near costa. Antennae with scape and pedicellus blackish above, paler at apex, flavous marked below in female and more distinctly so in male; with annellus and extreme base of postannellus more or less pale; beyond that ferrugineous above, paler below. Thorax and propodeum black, with the following parts stramineous to bright flavous: pronotum as described for *hofferi* Greg., large quadrangular apical mark and lateral extensions of scutellum and metascutellum, tegulae, and marks below fore and hind wings: propleura usually only obscurely pale on hind margin, never in greater part. Legs with fore and mid coxae, and all trochanters and trochanterelli, mainly stramineous to pale flavous; with hind coxae blackish at base, especially above: fore and mid femora, tibiae and tarsi pale rufous, the femora flavescent towards apex: hind legs with femora rufous and tibiae and tarsi dull rufous, the tibiae broadly towards apex and tarsi largely infusate; sometimes with femora at apex and tibiae a little distance from base obscurely infusate. Wings with veins and stigma ferrugineous, pale at base. Gaster with petiolar segment black in about basal two-thirds and at hinder angles, sometimes more extensively; with remainder of tergite 1, tergites 2 to 4 mainly, and sometimes 5 at mid base or more extensively, rufous; with remainder of dorsum and with third valvulae blackish, but tergites 2 to 3 or 4 with rather obscure flavous hind margins, and remaining tergites margined ivory-white: female hypopygium blackish, sometimes partly rufescent, narrowly pale-margined: male with last three visible sternites similar, the first of these more broadly pale-margined.

Described from the following material: BELGIUM, unlocalized, 1 ♀, C. Wesmael: FINLAND, province Nyland (Uusimaa), Pernå, 1 ♂, 3 ♀♀, Å. Nordström; Pargas, 1 ♀, E. Reuter. Further material seen: SWEDEN, unlocalized, 2 ♂♂, coll. Ljung (Thomson coll.); Östergötland, Mjölsefall, 1 ♂, 5.viii (type); Åby, 1 ♂, A. v. Goës. These males are darker on gaster than as above described. Thomson's female specimen from Pålsjö is missing.

Ct. lineiger var. **nordströmi** var. n.

Differs from the type form in having the gaster not largely rufous but black, apart from the pale hind margins: tergites 2 and 3 have hind margins of a duller colour yet more conspicuous against the black background, and tergite 1 is obscurely pale-margined at apex: thyridia castaneous.

Described from the following material: FINLAND, Pernå, 3 ♂♂, 1 ♀ (type), Å. Nordström.

Recorded dates of capture of type form and variety range from 13.vii to 23.viii.

W. Hellén first sent two males of the black-bodied form of this species for my opinion. I told him I believed the species to be new, and that I would place it nearest to *hofferi* Greg., and gave him the main differences I found from that species.

Later he wrote me that he had since associated the female sex with the male, and also a red-bodied form of the species with the black-bodied. He added that the captor, Lektor Å. Nordström, wished to present me with specimens, and that he himself would like me to describe the species in the course of my paper.

However, I placed the red-bodied form tentatively as *exstirpatorius* Hlgr. non Grav.; and in 1952 I was able to confirm this by comparison with the type in Stockholm and with two specimens in Thomson's collection. But to Dr. Hellén belongs the credit for being, as I believe, the first to associate real red- and black-bodied forms of a European species of *Cteniscus*. The black-bodied form has been captured exclusively by Lektor Nordström, and I have pleasure in naming this seemingly distinct variety after him.

***Cteniscus curtisii* Haliday**

1838 *Tryphon* (subgenus *Cteniscus*) *curtisii* Haliday, *Ann. Mag. nat. Hist.* (1) **2**: 113.

1855 *Exenterus sexcinctus* Holmgren, *Svensk Vet.-Akad. Handl.*, **1**: 229-230 (non Gravenhorst 1829).

1871 ? *Cteniscus sexcinctus* Brischke, *Schrift. Phys.-ökon. Ges. Königsberg*, **11**: 97.

1878 ? *Cteniscus sexcinctus* Brischke, *Schrift. naturf. Ges. Danzig*, **4**: 104 (= *sexcinctus* var. 1, Schmiedeknecht 1911: 2288).

1913 *Cteniscus curtisii* Roman, *Ent. Tidskr.* **32**: 129.

1929 *Cteniscus curtisii* Gregor, *Zpravy esk. Stát. Real. Gymn. Nové Jičín*, **1929**: 4-5 (separate pagination).

Head somewhat strongly narrowed and, in larger specimens, scarcely rounded behind the eyes; moderately and rather evenly emarginate behind; distinctly shorter behind eye than eye length, seen from above: shining, with vertical region and temples for the most part finely punctate, but near occiput and on cheeks less finely so; upper face moderately and lower face rather coarsely punctate. Clypeus more or less coarsely, rather shallowly and sparsely punctate; deeply delimited; generally somewhat broadly rounded apically; strongly convex in basal and more or less impressed in apical half. Malar space in female about three-quarters and in male about one-half distance between mandibular apices. Hypostomal costa slightly raised to beyond junction with genal costa, which is not very far behind mandibular base: gena with a slight concavity outside this junction. Upper mandibular tooth slightly longer than lower.

Antennae with scape short, somewhat strongly convex dorsally and moderately

excised externo-ventrally; with post-annellus 1.4 to 1.5 times length of following segment: flagellum 27- to 32-segmented (32 in type), slightly expanded in middle.

Pronotum with dorsal transverse impression sharp, transcostate; with epomiae rather strong above; shining and rather finely punctate above, merging to transversely rugose below. Propleura moderately and rather closely punctate, anteriorly finely rugose. Mesoscutum moderately convex; with notaulices strongly and sharply impressed; closely and for the most part moderately to rather coarsely punctate. Scutellum not strongly convex, often rather flattened discally; sparsely punctate above and on sides, more closely so behind; with margins not sharp much beyond scutellar fovea. Mesopleura rather closely and coarsely punctate below, more finely and much more sparsely so above; sternaules broad and rather superficial but quite distinct: mesosternum moderately and somewhat closely punctate in front, more finely and sparsely so behind: prepectus closely and rather strongly punctate: epicnemial carina slightly elevated: mesolcus moderately impressed and parallel-sided for the greater part of its length, suddenly enlarged before the transverse costa which partly closes it behind. Metascutellum smooth, normally raised. Propodeum relatively strongly griseo-pilose and closely, finely to moderately punctate, with the area pleuralis most distinctly punctate; shining, but with some areas having obsolete rugulosity, the area posteromedia very distinctly rugulose; with costae rather strong but costulae weaker, sometimes incomplete: area superomedia emitting costulae behind middle, broadest at that point; relatively broad, with the almost straight sides converging strongly from costulae to base; basally delimited.

Gaster stoutly spindle-shaped in female, very much less rounded in male: petiolar segment, except near apex, coriaceous, or in part weakly rugose: gaster otherwise smooth and shining. Petiolar segment of female broad, its breadth being approximately as great as its length (39: 39 in type, tending to be less in smaller and greater in larger specimens); of male 1.2 to 1.3 times length of its greatest breadth; with sides almost evenly rounded and not very strongly margined in female, the spiracles not prominent; with keels distinct to middle, to which it is strongly raised. Tergite 2 with thyridia rather narrow in female, broad and conspicuous in male; with diagonal basal impressions discernible. Female hypopygium pointed apically: third valvulae extending distinctly beyond apex of tergite 8.

Fore wings with basal and disco-cubital veins not nearly parallel; with areolet shortly or scarcely petiolate, not very broad, its outer vein almost interstitial with the second recurrent; with nervus parallelus emitted distinctly a little below middle of brachial cell. Hind wings with nervellus antefurcal and intercepted rather far below middle.

Legs with the hind tibiae and tarsi very thick, thicker than in *hofferi* Greg. (Fig. 81), the hind metatarsus in inner side view about $5\frac{1}{2}$ times length of its greatest breadth. Claws of all tarsi strongly pectinate, but more sparsely so in male.

Length $6\frac{1}{2}$ to 9 mm.

Head black, with the following parts bright stramineous, margined with rufous: mandibles except at apex, clypeus except narrowly round base, and broad lateral marks on the lower face extending through full width of the malar space down to the genae: these marks extend on the genae from eye margin about half-way to costa;

and they leave the lower face black rather broadly below antennae to eye margin, broadly down mid line, and, usually narrowly, along clypeo-frontal suture. Palpi stramineous to rufous. Antennae dull ferrugineous, with basal segments usually almost black except at their apices: sometimes rather paler. Thorax and propodeum black, with the following parts bright flavous: humeral angle and mark in lower angle of pronotum, a mark below hind wings, and quadrangular apical marks and hind margins of scutellum and metascutellum: tegulae usually mostly rufous, sometimes flavous. Legs red; with fore and mid legs in part, especially on trochanterelli, tending to dull flavous; with hind tibiae and tarsi black, the tibiae with some infusion of reddish colour, especially beneath and in smaller specimens, distinctly stramineous at base and indistinctly fulvous at extreme base. Wings slightly infumate, with veins and stigma ferrugineous, much paler at base. Gaster black above, the tergites having pale apical margins narrow or very narrow: sternites usually mainly black, the female hypopygium black with narrow pale margin: thyridia castaneous.

Redescribed from the following material: IRELAND, 1 ♀, Haliday coll. (type): Co. Wicklow, Meeting of the Waters below Rathdrum, 1 ♀, 6. viii. 1925, A. W. Stelfox: ENGLAND, 1 ♀, Desvignes coll. (previously undetermined), 1 ♀, Smith coll.; Surrey, Oxshott, 1 ♀, 6.vii.1892, Melville-Bury coll. (Manchester Museum); Essex, Colchester, 2 ♀♀, 1903, 1914, Harwood; Lancs. S., Chat Moss, 1 ♀, 21.ix.1941, H. Britten: FRANCE, 1 ♀ (probably France), de Gaulle; Corrèze, Bort-les-Orgues, 1 ♀, 15-23.vi.1934, M. E. Mosely: ITALY, Piedmont, 1 ♀, 1859, O. Sichel: BELGIUM, Vivier d'Oie, 1 ♂, 27.v.1889, 1 ♀, 4.viii.1880: Hestreux, 2 ♀♀, 5-9.viii.1884; Liège, 2 ♀♀, 1862, coll. J. Tosquinet: HOLLAND, N. Brabant, Burgst, 1 ♂, vi.1913, Smits van Burgst: GERMANY, Hamburg, Trittau, 1 ♀, 7.vii.1945, G. Heinrich: CZECHOSLOVAKIA, Chodau, 2 ♀♀, R. von Stein coll.; Ubučín, 1 ♀, 7.viii.1924, Fr. Gregor: FINLAND, Parikkala, 1 ♀, W. Hellén.

Additional material seen: SWEDEN, Skåne, Pålshö, 1 ♂; 1 ♀ without data, Thomson coll.; 1 ♀ province Darlarne, 1 ♀ Lapland, Boheman: POLAND, Pomorzia, Sepolno, 1 ♀ 25.viii.1939, G. Heinrich.

This species has been very little understood since its description, partly owing, no doubt, to its apparent scarcity. It is hoped that the characters now given in the key to species will suffice to separate it from its nearest relatives. As shown by Roman (1913), it was misidentified by Holmgren as *sexcinctus* Grav., and it has stood under that name in the Tosquinet and other collections. Characters given by Gregor (1929) have been unavailable to those ignorant of the Czech language: having received a translation of this paper, I am able to render the passage in question in the following words: 'abdomen black, with thin pale borders to the segments. Scutellum and metascutellum posteriorly yellow-marked, with a white border going to the wings. Mandibles with teeth of equal length (in contradistinction to *Acrotomus sexcinctus* and *succinctus*). The face has two white trapezium-shaped spots touching the eyes and connected with the white genae. Hypopygium black. Hind tarsi and tibiae (except at base) black. Abdomen shining, finely punctate.' The species placed as *curtisii* in the Desvignes collection is a male of *hofferi* Gregor (q.v.).

Biology. Since the above was written, I have seen a specimen reared from *Hemichroa australis* Lep. (= *alni* auctt. non L.): ENGLAND, Beds., Flitwick Moor, 1 ♀ ex larva

taken 13.vii.1947 on *Betula*, em. 26.viii.1947, V. H. Chambers. As indicated in the synonymic table, it is most probably this species, recorded as *Cteniscus sexcinctus*, that was reared from '*Dineura alni*' by Brischke (1871, 1878).

***Cteniscus romani* sp. n.**

1871 ? *Cteniscus sexcinctus* var. Brischke, *Schrift. Phys.-ökon. Ges. Königsberg*, **11**: 97 (non Gravenhorst 1829).

1878 ? *Cteniscus sexcinctus* var. Brischke, *Schrift. naturf. Ges. Danzig*, **4**: 104 (= *sexcinctus* var. 2 Schmiedeknecht 1911: 2288).

1948 *Cteniscus curtisi* var. Teunissen, *Tijds. Ent.* **89**: 13 (non Haliday 1838).

Head moderately to strongly narrowed behind eyes, moderately or rather shallowly emarginate behind; about as long behind eyes as eye length, seen from above: punctate on vertical region, temples and cheeks as described for *curtisi* Hal.; on upper face rather finely and on lower face moderately, sometimes in middle rather coarsely punctate, on both much more sparsely so than in *curtisi* Hal., and with an impunctate area above each antennal socket. Clypeus rather sparsely beset with punctures of mixed sizes, fine to rather coarse; deeply delimited basally; moderately convex in basal half, and somewhat impressed before the rather narrowly to moderately rounded apex. Malar space nearly three-quarters distance between mandibular apices in female, about half such distance in male. Hypostomal costa very slightly raised, bent distinctly outwards; its junction with genal costa farther behind mandibular base than in *curtisi* Hal.

Antennae with scape rather short, and with a sharp lateral excision (Fig. 84); with postannellus about 1.4 times length of following segment in female, about 1.3 times in male: flagellum 28- to 33-segmented.

Thorax and propodeum structure differing from that described for *curtisi* Hal. as follows: pronotum narrower before dorsal impression: propleura rather sparsely punctate: mesoscutum less coarsely and closely punctate: mesopleura rather finely to moderately and sparsely punctate below, finely so above: sternaulices rather weakly impressed: mesosternum less closely punctate: prepectus moderately and, except at sides, sparsely punctate, more excavate than in *curtisi* Hal.: propodeum having area externa more finely and area pleuralis more distinctly punctate; area posteromedia smoother; costulae indicated but seldom developed, emitted from about middle of area superomedia, which is relatively narrow, distinctly longer than broad, with sides somewhat rounded and not strongly converging, and not basally delimited.

Gaster stoutly spindle-shaped in female, behind petiolar segment almost straight-sided in male, its structure differing from that described for *curtisi* Hal. as follows: petiolar segment mainly smooth, but to some extent obscurely rugose at sides; a little longer, 1.1 to 1.3 times length of its greatest breadth in female, 1.1 to 1.4 times in male; more strongly narrowed to base; more strongly raised to middle, having dorsal keels distinct not nearly to middle: basal diagonal impressions of tergite 2 more evident: female hypopygium less pointed, and third valvulae projecting scarcely beyond apex of tergite 8.

Structure of legs and fore wings as described for *curtisii* Hal.: hind wings with nervellus strongly antefurcal and intercepted very low.

Length $6\frac{1}{2}$ to 10 mm.

Head coloured as in *curtisii* Hal., but pale, bright flavous in place of stramineous, and a little more extensively pale on genae: palpi also mainly flavous. Female antennae with scape, pedicellus, and annellus black to ferrugineous, paler at apex and beneath; beyond annellus pale rufous, darkened in about apical half: male antennae much duller. Thorax differs from *curtisii* Hal. in having scutellum and metascutellum without conspicuous quadrangular pale marks at mid apex: scutellum obscurely dull red at mid apex, bright flavous only at sides of hind margin, where metascutellum is obscurely pale: tegulae scarcely rufous: fore and hind margins of mesopleuron and sub-tegular mark often dull castaneous. Legs as described for *curtisii* Hal. but fore and mid legs more yellowed, especially in front; hind femora often for the most part much darkened, and hind tarsi often infused reddish. Wing colour as described for *curtisii* Hal. Pale margins of tergites 6 and 7 and of female hypopygium rather broader than in *curtisii* Hal.

Described from the following material: IRELAND, Co. Dublin, Slade of Saggart, 1 ♀, 16.ix.1942; Co. Wicklow, Deputy's Pass, 1 ♂, 11.ix.1932, A. W. Stelfox: FRANCE, Ardennes, Vendresse, 1 ♂, 30.ix.1912, R. Benoist: BELGIUM, unlocalized, 5 ♀♀, coll. Wesmael; Vivier d'Oie, 1 ♀, 9.x.1883, J. Tosquinet (type): HOLLAND, Tilburg, 1 ♀, 16.ix.1941, H. G. M. Teunissen (Teunissen 1948): GERMANY, Radbruch, 1 ♀, 25.ix.1938, R. Hinz; Holstein, Trittau, Hahnheide, 2 ♂♂, 2 ♀♀, ix.1945, G. Heinrich: SWEDEN, Småland, Lommaryd, 1 ♂, 31.viii, 1 ♀, 12.ix. (mus. Stockholm, ? year and collector): FINLAND, Säkylä Kolva, 1 ♀, W. Hellén; Lojo, 1 ♂, 1938, R. Krogerus.

Dedicated with respect and gratitude to the late Dr. A. Roman.

Cteniscus elegans Stephens

1835 *Tryphon elegans* Stephens, *Illustrations of British Entomology*, 7: 239.

1871 ? *Cteniscus gnathoxanthus* var. 2 Brischke, *Schrift. Phys.-ökon. Ges. Königsberg*, 11: 98 (non Gravenhorst 1829).

1878 ? *Cteniscus gnathoxanthus* var. 2 Brischke, *Schrift. naturf. Ges. Danzig*, 4: 105 (= *Ct. gnathoxanthus* var. 2 Schmiedeknecht 1912: 2329).

1911 *Exenterus elegans* Morley, *The Ichneumons of Great Britain*, 4: 204-205.

1914 *Cteniscus aulicus* Roman, *Ark. Zool.* 9 (2): 14-16, **syn.n.**

1948 *Cteniscus elegans* Teunissen, *Tijds. Ent.* 89: 13.

The unique female type of *Cteniscus aulicus* Roman was taken by Boheman in the southern Swedish province of Blekinge. Roman first labelled it '*aulicus* Rn n.sp. ? = *fulvipes* Krb. ♀'. Evidently added at a later date is a second label in Roman's handwriting '? *elegans* Sph.' Having with me a pair of Stephens's species, previously compared with the type, I have been able to compare Roman's type with them, and can establish their specific identity.

Head slightly but rather sharply narrowed behind eyes, then rounded; about as long behind eyes as eye length, seen from above; shallowly emarginate behind: on vertex, temples and cheeks finely and rather sparsely punctate, more densely so near occiput and lower genal margin: less finely and sparsely punctate than temples is the lower

face, particularly on epistoma: upper face still more closely punctate, with strong scrobal impressions, and usually with a distinct Y-shaped furrow below median ocellus. Clypeus somewhat sparsely beset with punctures of mixed sizes, fine to moderate or rather coarse, denser near basal margin; rather deeply and sharply delimited basally; strongly convex in basal half, strongly impressed before the reflexed and narrowly rounded apex. Malar space equal to distance between mandibular apices in female, rather less in male. Hypostomal costa bent outward, strongly and roundedly raised to where met by genal costa rather close behind mandibular base, thence falling gradually to foramen magnum.

Antennae with scape moderately excised externo-ventrally: flagellum 27- to 29-segmented, slightly expanded in middle, therefrom tapering gradually to apex.

Pronotum with dorsal transverse furrow moderately impressed, broader in middle; with epomiae weak or very weak; laterally rather finely punctate above, more or less rugose or rugulose below. Propleura rather finely punctate, quite densely so at sides. Mesoscutum rising sharply from pronotum, rather strongly or strongly convex in front, but more flattened behind; with notaulices sharply impressed; very finely and rather sparsely punctate discally, less finely and more densely so peripherally, and especially in front. Scutellum moderately convex, somewhat flattened discally; finely and for the most part sparsely punctate; not margined beyond scutellar fovea. Mesopleura moderately punctate below, more finely so above: sternaulices weakly to moderately impressed: mesosternum and prepectus moderately punctate: mesolcus normally impressed; posteriorly a little widened, and transcostate but scarcely closed. Propodeum more or less rugulose, or on area posteromedia partly rugose; on area externa finely, and on area pleuralis moderately and densely punctate; with costae normally complete, but mostly rather weak: area superomedia about as broad as long, strongly contracted from costulae to base, generally (but not in type) basally delimited.

Gaster spindle-shaped in female, behind petiolar segment parallel-sided or somewhat narrowed in male. Petiolar segment 1.2 to 1.3 times length of its greatest breadth in female, 1.4 to 1.6 times in male; with basal lobes distinct but not strong; not strongly margined, with spiracles well before middle and not prominent; rather strongly raised in middle, but not as much so as in *curtisii* Hal.; with dorsal keels moderate or rather strong, distinct to beyond middle; smooth at mid apex and between keels; very obscurely rugose beside the keels, finely and distinctly so near apical angles. Remainder of gaster smooth and shining: tergite 2 with thyridia distinct, very narrow in female, more crescentic in male. Female hypopygium much as in *hofferi* Gregor: female third valvulae more pointed than in that species, reaching to about apex of tergite 8.

Wings as described for *hofferi* Gregor, but nervellus not so strongly antefurcal.

Claws of all tarsi rather strongly pectinate.

Length 7 mm.

Head black; with palpi, mandibles except at apex, and clypeus stramineous-white: the palpi and mandibles are to some extent suffused fulvous, and the clypeus is fulvous along extreme apical margin. Antennae with scape and pedicellus black or almost so, marginally paler; with annellus and extreme base of postannellus pale;

with remainder of flagellum dull fulvous below, ferrugineous above, the basal segments apically paler. Thorax and propodeum black, with lower angles of pronotum pale; with humeral angles of pronotum and with tegulae stramineous; with scutellum and metascutellum stramineous to flavous at apex, discally rufo-fulvous. Legs with all coxae and femora bright fulvous, the femora paler at apex: trochanters and trochanterelli stramineous, the hind trochanters basally fulvous: fore and mid tibiae and tarsi more or less pale dull fulvous, the tarsi dark at extreme apex: hind tibiae broadly at apex and tarsi ferrugineous, the tibiae mainly dull fulvous, broadly dull stramineous at base. Wings with veins and stigma ferrugineous, basally stramineous. Gaster coloration as described for *hofferi* Gregor.

Redescribed from the following material: ENGLAND, Kent, Darenth Wood, type ♀, J. F. Stephens; Devon, Barnstaple, 1 ♀, T. A. Marshall coll.; Staffs., Lichfield dist., 1 ♂, 1 ♀, 1922, L. A. Carr; GERMANY, Köln, 1 ♀, 13.v.1940, W. Aerts; CZECHOSLOVAKIA, Moravia, Pouzdřany, 6.vi.1937, Fr. Gregor.

Additional material seen: SWEDEN, Skåne, Esperöd, 1 ♂, 20.vi, 1 ♀ (probably also from Skåne), C. G. Thomson; Blekinge, 1 ♀, C. Boheman (type of *aulicus* Roman). Recently recorded from Holland (Teunissen 1948).

Brischke's *Cteniscus* '*gnathoxanthus* var. 2', recorded from the Danzig district (1878), may very well be this species. It was reared from *Periclista pubescens* Zadd., a sawfly species attached to *Quercus*.

***Cteniscus pectoralis* Hellén**

1951 *Cteniscus pectoralis* Hellén, *Notul. ent., Helsingf.* 31: 31.

Head rather strongly transverse, a little shorter behind eyes than eye length, seen from above; very slightly narrowed behind eyes and then rounded; rather shallowly emarginate behind: on vertical region and temples for the most part very finely and sparsely punctate, but near occiput and on cheeks less finely and sparsely so, and by lower genal margin moderately alutaceo-punctate: lower face moderately to rather coarsely and densely punctate: upper face rather finely and densely so, with transverse rugosities just above antennal sockets, and with a distinct inter-antennal keel. Clypeus rather sparsely beset with punctures of mixed sizes, fine to rather coarse; sharply but not deeply delimited basally; strongly projecting though weakly convex; scarcely impressed before the moderately rounded apex. Malar space (female) clearly greater than distance between mandibular apices. Hypostomal costa more than slightly but not strongly raised; met by genal costa at about a right angle, as far behind mandibular base as length of malar space.

Antennae with scape somewhat strongly convex dorsally, about as much so as in *curtisii* Hal. but more elongate, moderately excised externo-ventrally (both broken off beyond postannellus in unique type).

Pronotum with dorsal transverse furrow sharply impressed, bisected by a median keel; with epomiae short and weak; laterally finely punctate and shining before humeral angle, but in greater part obsoletely rugose. Propleura shallowly, moderately to rather coarsely and densely punctate. Mesoscutum moderately convex; with notaulices strongly and sharply impressed; shallowly but coarsely and closely punctate

and obsoletely rugose between notaulices, merging to much more finely punctate peripherally and behind. Scutellum rather strongly convex; very finely punctate; not margined beyond scutellar fovea. Mesopleura rather finely to moderately and not closely punctate; with a large impunctate speculum: sternaules very superficial: mesosternum moderately punctate in front, more finely and sparsely so behind: prepectus moderately punctate: epicnemial carina indicated but incomplete medially: mesolcus moderately impressed, greatly broadened and with several transverse costae but not closed behind. Propodeum for the most part obsoletely rugose, but with areae superomedia, dentipara, and posteromedia near mid apex, quite strongly so; with areae externa and pleuralis finely punctate; with costae quite strong at sides and behind, but weaker and irregular above, including the costulae: area postero-media not reaching middle: area superomedia about as long as broad, not delimited basally.

Petiole segment elongate, 1.6 times length of its greatest breadth; with a narrow waist near base and then strongly explanate (rather as in *Eclytus fontinalis* Hlgr. but not strongly contracted again just before apex); sharply margined laterally; with dorsal keels strongly raised, sharp to about level of spiracles but continuing blunter to about last quarter of segment, bounding a median longitudinal pit and falling sharply to lateral furrows; finely rugulose, smooth near mid apex. Remainder of gaster elongate and slender: tergite 2 a little expanded to apex, with thyridia small but distinct: remaining tergites contracted to apex, tergites 3 to 5 each the length of its basal breadth: tergites 2 and 3 finely alutaceo-punctate, the remainder very finely punctate and shining. Female hypopygium elongate, folded mid-ventrally but not sharply so: female third valvulae elongate, narrow in ventral view, somewhat pointed in side view, strongly hairy, extending far beyond apex of tergite 8.

Fore wings with radial cell almost three times as long as broad; with basal and disco-cubital veins almost parallel; with areolet shortly petiolate, not broad; with nervus parallelus emitted below middle of brachial cell. Hind wings with nervellus strongly antefurcal, and intercepted well below middle.

Legs, notably hind femora and tibiae, very elongate and slender. Claws of hind tarsi each with three, rather small, widely spaced comb-teeth.

Length 11½ mm.

Head black, with the following parts stramineous, tinged with flavous: labium and maxillae, clypeus, and lower face continuous with genae broadly: there are fulvous upper margins to pale part of genae and lower face, and a small median mark of the same colour on upper part of lower face: mandibles more ochreous, black at apex. Antennae with scape, pedicellus and annellus pale ferrugineous to castaneous above, merging to deep flavous below: postannellus deep ferrugineous. Thorax and propodeum black, with the following rufo-fulvous above, pale dull flavous below: pronotum, scutellum, metascutellum, mark above epicnemial carina extending down prepectus, and mark above mid coxa, these last two faintly connecting across mesopleuron: propleura pale flavous, tinged with fulvous: humeral angle of pronotum and mark below fore wing pale bright flavous, tegulae duller: mark below margin of scutellar fovea and marks on propodeum dull rufous: hind margins of mesopleuron, scutellum and metascutellum obscurely pale. Fore and mid coxae, trochanters and trochan-

terelli coloured as propleura: fore and mid femora fulvous, obscurely paler at base and apex, and their tibiae and tarsi paler: hind coxae rufous, as also hind trochanters and trochanterelli in inner side view and below; but the last two infusate in outer side view and pale at base and apex: hind femora, tibiae, and tarsi deep ferrugineous; with femora and first four tarsal segments pale at extreme base and apex; with tibiae pale at base and extreme apex; with fifth tarsal segment, and fourth below, pale rufous. Wings with veins and stigma ferrugineous, the stigma very pale at base. Gaster black above, stramineous to pale flavous below: tergites 1 to 6 with narrow, pale apical margins and tergite 7 with an obscure, triangularly broadened one: third valvulae pale, partly infusate above, and rufous towards apex.

Redescribed from the unique holotype, FINLAND, Esbo, 1 ♀, R. Frey.

Most closely related to *Ct. uncinatus* Hlgr. in the elongate, slender body, and particularly the legs; in the ventrally folded (though not sharply folded) hypopygium; and in the pale pectoral coloration. It differs notably from that species, however, in having the head slightly shorter behind eyes than eye length, seen from above; and is unique among known palaearctic species in having the gaster so elongate that tergites 4 and 5 are as long as their breadth at base. As to whether the imperfectly formed epicnemial carina is a good specific character or a mere individual variation, remains to be seen.

I wish to thank Dr. W. Hellén for his close co-operation in allowing me, before his description had appeared in print, to make a study of his very distinct and interesting species for inclusion in my paper.

***Cteniscus uncinatus* Holmgren**

1858 *Exenterus uncinatus* Holmgren, *Svensk Vet.-Akad. Handl.* 1: 234.

1858 *Exenterus macrocephalus* Holmgren, *ibid.*: 243 (synonym by Roman 1914).

1896 *Cteniscus macrocephalus* Jacobs & Tosquinet, *Ann. Soc. ent. Belg.* 34: 108.

1914 *Cteniscus uncinatus* Roman, *Ark. Zool.* 9 (2): 17.

1942 *Cteniscus uncinatus* Kerrich, *Trans. Soc. Br. Ent.* 8 (2): 63-64.

Head much longer behind eyes than eye length, seen from above; distinctly broadened and rounded behind eyes, in well-developed specimens strongly so; somewhat strongly and sometimes rather angularly emarginate behind: on vertical region, temples and inner orbits finely to rather finely and rather sparsely punctate, on upper face closely so; genae and epistoma rather finely to moderately and closely punctate. Clypeus strongly transverse, more than twice as broad as long; fairly closely beset with punctures of different sizes, fine to rather coarse; not deeply delimited basally; weakly convex before the slightly reflexed and very broadly rounded apex. Malar space a little less than distance between mandibular apices in female, a little more than half this distance in male. Hypostomal costa bent strongly outward, very slightly and evenly raised; met by genal costa, at nearly a right angle, as far behind mandibular base as distance between mandibular apices. Mandible with lower tooth more prominent than upper, rather in the manner of *Acrotomus* and *Anisoctenion*, but always a little shorter.

Antennae with scape (Fig. 82) strongly convex dorsally, rather weakly excised externo-ventrally; with pedicellus relatively elongate; with postannellus about one-

eighth longer than following segment; with flagellum filiform, decidedly slender, 23- to 26-segmented.

Pronotum strongly produced forward, as in *Anisoctenion alacer* Grav.; with dorsal transverse furrow strongly impressed, broad and shining; with epomiae of moderate strength, sharp, not shortened below; laterally rather finely and closely punctate above, with some rugosity developed below. Propleura finely punctate; with outer hind angles strongly produced and reflected. Mesoscutum rather strongly convex; with notaulices of moderate strength, extending well back on to disk; very finely punctate or, to a greater or lesser extent, not so finely so. Scutellum moderately convex; finely and closely punctate above and behind, very finely and sparsely so at sides; not margined beyond scutellar fovea. Mesopleura finely punctate above, rather finely to moderately and not closely so below (never so closely as in *curtisii* Hal.): sternaules rather shallow, but broad and very distinct: mesosternum finely and closely punctate; prepectus rather coarsely and very closely so, bearing a pair of short keels just behind lower angles of pronotum: epicnemial carina quite distinctly though not strongly elevated: mesolcus sharply impressed, partly closed behind. Propodeum relatively elongate and not abruptly declived; with pilosity long but not thick; generally finely punctate on area externa, elsewhere very finely so, shining, seldom with much rugulosity; with costae sharp at sides and behind and with costulae complete: area superomedia about one and a half times as long as broad, or longer, not basally delimited.

Petiolar segment elongate, 1.8 to 2.3 times length of its greatest breadth; almost regularly expanded from near base to near apex, though sometimes the spiracles are prominent; with dorsal keels sharp, approaching rather closely before and between spiracles, distinct for about two-thirds length of segment; very obscurely rugose between and beside keels, smooth and shining behind. Remainder of gaster smooth and shining: tergite 2 with thyridia distinct. Female hypopygium sharply folded medially in apical half: female third valvulae elongate pilose, projecting beyond apex of tergite 8, small, varying considerably in shape.

Fore wings with basal and disco-cubital veins not strongly divergent; with areolet sessile to shortly petiolate; with nervus parallelus emitted a little below middle of brachial cell. Hind wings with nervellus distinctly antefurcal and intercepted far below middle.

Legs elongate and slender. Tarsal claws with short, fine pectination, weaker in male.

Length 7 to $8\frac{1}{2}$ mm. in specimens redescribed, but down to 4 mm. in a female specimen from Lapland.

Female. Head colour as described for *Exyston genalis* Thoms. (p. 376), but pale coloration sometimes extending on to upper face right round antennal sockets. Antennae bright ochreous; with scape and pedicellus pale beneath, ferrugineous marked at sides; with annellus pale; with following few segments ferrugineous, pale at apex. Thorax and propodeum black, with the following parts stramineous to pale flavous, to some extent flushed with rufous: tegulae, pronotum very largely, propleura and mesosternum totally, mesopleura below tegulae, along front and hind margins, and largely below; often pale-marked also on metascutellum and propodeum:

scutellum usually distinctly but sometimes rather obscurely pale-marked, near mid apex or more extensively on disk, at sides of hind margin, and below margins of fovea. Similarly pale-coloured are the coxae, trochanters, trochanterelli, and base and apex of hind femora: legs otherwise more testaceous, but with hind femora mainly ferrugineous, hind coxae above and usually hind tibiae above and at apex marked with the same colour. Wing colour as described for *Ct. elegans* Steph. Gaster mainly black above, flavous to testaceous below, including the hypopygium, and sometimes also the whole of tergites 6 to 8: tergite 1 with a median pale mark very near apex; and remaining black tergites with pale apical margins, which are usually triangularly produced forward conspicuously on 2 and 3, and sometimes more obscurely on 4: thyridia small, but pale and conspicuous.

Male differs as follows: pale coloration of head just reaching up to antennal sockets, and extending to a line going from a point on hypostomal costa rather close behind mandibular base to a point about a quarter the way up outer orbit. Antennal flagellum darker, sometimes in greater part ferrugineous. Pronotum black, except for lower and humeral angles: propleura usually only marginally pale: mesopleura below and mesosternum black, except sometimes for margin of prepectus and a Y-shaped mark by sternaules: scutellum and metascutellum not or obscurely pale-marked in middle, and propodeum unmarked. Hind tibiae and also hind tarsi above often more strongly ferrugineous marked: hind coxae sometimes mainly ferrugineous. Black coloration extending nearer lateral margins of tergites 3 and following, and tergites 6 and 7 only very narrowly pale at apex: in one southern Swedish specimen the pale marks on tergites 2 and 3 greatly reduced; and, according to Holmgren (p. 234), only the second tergite conspicuously pale-banded in type material from Lapland.

Redescribed from the following material: ENGLAND, Hants, New Forest, 1 ♀, vi.1902, D. Sharp: FRANCE, Paris district, Maisons Laffitte, 1 ♂, Forêt de St. Germain, 1 ♀, II.v., Fontainebleau, 1 ♀, 12.vi.1900, J. de Gaulle: BELGIUM, Groenendaele, 1 ♀, 27.vi.1892, 1 ♀, 8.vii.1880, J. Tosquinet: GERMANY, Berlin district, 1 ♀, 1.vi.1856, Ruthe coll.: SWEDEN, Skåne, Höör district, 2 ♂♂, 8.vi, 1 ♂, 10.vi.1938, D. M. S. & J. F. Perkins.

Further material seen: SWEDEN, type and other specimens in Royal Natural History Museum, Stockholm (see Roman, 1914, Kerrich, 1942).

***Cteniscus consobrinus* Holmgren**

Head shape in dorsal view as described for *unicinctus* Hlgr.: punctuation much as described for that species, but in general somewhat finer and denser. Eyes in male slightly convergent. Clypeus as described for *unicinctus* Hlgr., but deeply delimited basally, and in male not very broadly rounded at apex. Malar space about equal to distance between mandibular apices in both sexes. Hypostomal and genal costae as described for *unicinctus* Hlgr., but meeting at much less than a right angle. Mandible with lower tooth in same plane as and distinctly shorter than upper.

Antennae with scape of normal proportions, rather weakly excised externo-ventrally; with postannellus about 1.3 times length of following segment; with flagellum not relatively slender, 24- to 25-segmented.

Pronotum much less produced forward than in *unicinctus* Hlgr., sharply declived to the dorsal transverse furrow; with epomiae rather weak, evanescent below; laterally finely and not very distinctly punctate above, strongly rugose below. Propleura as described for *unicinctus* Hlgr. Mesoscutum rising sharply from pronotum, moderately convex; with notaulices rather strongly impressed but short, not quite reaching anterior margin; finely to very finely and obscurely punctate. Scutellum moderately convex; very finely punctate; margined a little beyond scutellar fovea. Mesopleura finely and not closely punctate below, sparsely and very finely so above: sternaulices broad but superficial: mesosternum very finely punctate, prepectus rather finely so: epicnemial carina slightly elevated: mesolcus shallowly impressed anteriorly, deeply so posteriorly, partly closed behind. Propodeum rugulose-punctate, but with area pleuralis in large part shining; with costae including costulae sharp: area superomedia distinctly longer than broad, almost parallel-sided, not distinctly delimited basally, emitting costulae before middle.

Petiole segment 1.4 times length of its greatest breadth in type female, 1.7 to 2.0 times in male; with dorsal keels of moderate strength, distinct to beyond middle; dorsally coriaceous-rugose, smooth only near mid apex. Tergite 2 weakly coriaceous at base; with thyridia distinct. Remainder of gaster smooth and shining. Female hypopygium pointed but not sharply folded: female third valvulae broad, rather strongly pointed, projecting beyond apex of tergite 8.

Fore wings as described for *unicinctus* Hlgr.: hind wings with nervellus less antefurcal and intercepted not so far below middle.

Tarsal claws with pectination of moderate strength in female, weaker in male.

Length 7 to $7\frac{1}{2}$ mm.

Head coloured as in *Ct. romani* nov. (p. 430). Antennae dull ferrugineous, somewhat paler beneath; with scape, pedicellus and basal flagellar segments paler at apex; with scape and pedicellus beneath and with annellus conspicuously pale. Thorax and propodeum black, with the following pale: humeral angles of pronotum and tegulae distinctly, hind margin of scutellum at sides and mark below hind wing, and outer hind angle of propleura obscurely. Legs pale rufous; with trochanters and trochanterelli, and fore and mid coxae at least in part, pale flavous; with coxae otherwise darker, the hind coxae largely blackish, and with hind trochanters dark-marked above. Wing colour as described for *Ct. elegans* Steph. Gaster colour as described for *Ct. gnathoxanthus* Grav. except for female hypopygium which is ferrugineous, pale at mid base and with narrow pale margin.

Redescribed from the following material: IRELAND, Co. Wicklow, Glen of Imaal, 1 ♂, 27.v.1926, A. W. Stelfox: SWEDEN, Lapland, 1 ♀, 25.vii (holotype), 1 ♂ (allotype), C. Boheman.

***Cteniscus rufonotatus* Holmgren**

1858 *Exenterus rufonotatus* Holmgren, *Svensk Vet.-Akad. Handl.* 1: 243.

1883 *Cteniscus breviventris* Thomson, *Opuscula Entomologica*, fasc. 9: 890, **syn. n.**

1896 *Exenterus fulvipes* Kriechbaumer, *Ent. Nachrichten*, 22: 369, **syn. n.**

Head strongly transverse, a little shorter behind eye than eye length, seen from above; rather strongly or strongly narrowed and rounded behind eye; shallowly

emarginate behind: on vertex, temples, cheeks, and inner orbits very finely punctate, for the most part rather sparsely but on cheeks quite sparsely so; on upper face finely, very seldom in part closely punctate; on epistoma rather finely and not closely punctate. Clypeus sparsely beset with rather coarse punctures; sharply delimited basally; strongly convex to near the reflexed and more or less narrowly rounded apex. Malar space about five-eighths distance between mandibular apices. Hypostomal costa slightly and almost evenly raised, met by genal costa not close behind mandibular base. Mandibles with lower tooth distinctly a little longer and more prominent than upper, suggesting the condition in genus *Anisoctenion*.

Antennae with scape as described for *gnathoxanthus* Grav.; with flagellum rather stouter and more coarsely hairy, as in *gibbulus* Hlgr., 21- to 25-segmented.

Pronotum with dorsal transverse furrow strongly and quite sharply impressed, distinctly transcarinate; with epomiae rather strong; laterally finely or very finely punctate above, weakly to more or less strongly rugose below. Propleura finely and rather densely punctate. Mesoscutum rising sharply from pronotum, rather strongly convex, though somewhat flattened on disk; with notaulices rather strongly and sharply impressed; for the most part very finely punctate, more sparsely so on disk. Scutellum as described for *gnathoxanthus* Grav. Mesopleura rather closely beset with moderate punctures below, finely punctate above, and with speculum extending far forward: sternalices usually ill-defined and rather superficial: mesosternum finely and closely punctate in front, more finely and sparsely so behind, its halves distinctly convex: prepectus closely punctate, distinctly excavate: epicnemial carina slightly elevated: mesolcus strongly impressed, wider and deeper posteriorly, partly closed behind. Propodeum strongly raised to base of area superomedia; shining and for the most part obsoletely rugose in front, quite strongly rugose behind, including about half area pleuralis; with costae including costulae strong: area postero-media with median keel usually strong and percurrent: area superomedia a little longer than broad, emitting costulae about in middle, strongly contracted therefrom to base, where it is more or less distinctly delimited.

Gaster stoutly spindle-shaped in female, with sides decidedly rounded even in male. Petiolar segment of female 1.1 to 1.2 times length of its greatest breadth; strongly narrowed to base; without basal lobes, but with sides almost evenly rounded and sharply margined, the spiracles seldom at all prominent; dorsally weakly rugose to coriaceous or even smoother, smooth near mid apex; moderately raised in middle, with dorsal keels distinct for about three-quarters length of segment: petiolar segment of male about 1.3 times length of its greatest breadth; with spiracular tubercles prominent; dorsally more distinctly rugose, with keels sharp and generally almost percurrent. Remainder of gaster for the most part smooth and shining; tergite 2, however, slightly elevated in about basal half between thyridia; often weakly coriaceous upon this elevation, occasionally more strongly or extensively sculptured. Female hypopygium broadly rounded at apex, appearing almost truncate in middle when sides are folded: female third valvulae narrow (Fig. 86), projecting slightly beyond apex of tergite 8.

Wings as described for *curtisii* Hal. but areolet may be longer petiolate: stigma and radial cell broad, the latter about 2.1 times as long as broad.

Hind legs relatively stouter than in *gnathoxanthus* Grav. and *gibbulus* Hlgr.; but tibiae not so much thickened as in *hofferi* Greg. (Fig. 81), and metatarsi not thickened. Tarsal claws rather weakly and sparsely pectinate, more weakly so in male.

Length $4\frac{1}{2}$ to 7 mm.

Female. Head black, with the following parts bright stramineous, margined with rufous: palpi, mandibles except at apex, clypeus, and broad marks on genae: these approach, or more often traverse, the hypostomal costa just behind lower articulation of mandible, and they extend through malar space usually up to the tentorial pits, and thence triangularly about half way up orbits of lower face. Occasionally the lower face is colour-patterned as in *curtisii* Hal., or less extensively. Antennae rufous to ferrugineous, paler towards apex and below. Thorax and propodeum black, with the following parts stramineous to flavous: humeral angle of pronotum and mark in lower angle, which extends some way forward, propleura, and tegulae: hind margin of scutellum and metascutellum at sides, and mark below hind wing obscurely pale: scutellum sometimes dull castaneous behind. Legs mainly clear red, to some extent rather paler; with fore and mid coxae, except at base, trochanters and trochanterelli flavous; with hind tarsi darkened extensively but hind tibiae at apex only; sometimes with hind femora at apex and hind coxae blackish. Wings distinctly infumate; with veins and stigma pale ferrugineous, much paler at base. Gaster black above, the tergites with yellowish apical and lateral margins: tergite 2 sometimes, as in Holmgren's type, with a more or less triangular red mark and with thyridia castaneous: venter mainly pale, the sternites with large, paired dark marks; the hypopygium dark, with narrow pale margin.

Male differs as follows: pale mark of gena and lower face less extensive. Propleura pale at apex only.

Redescribed from the following material: IRELAND, Co. Wicklow, Rathdrum, 1 ♀, 13.viii.1925, A. W. Stelfox: BELGIUM, unlocalized, 4 ♀♀, C. Wesmael; Genck, 2 ♀♀, 25.viii.1886, 1 ♀, 21.viii.1892, Sicheu, 2 ♂♂ (one the type of *fulvipes* Kriechb.), 1 ♀ (hereby selected as allotype of *fulvipes* Kriechb.), 19.ix.1885, Schaffen, 2 ♀♀, 18.ix.1885, 1 ♀, 10.ix.1886, Molenstedt, 2 ♀♀, 23.ix.1886, Cagervine, 1 ♀, 25.ix.1885, J. Tosquinet: SWEDEN, Skåne, Torekov, 1 ♂, vii.1860 (lectotype of *breviventris* Thoms.), Räfteu, 1 ♀, 12.viii (allotype of *breviventris* Thoms.), ? C. D. E. Roth, C. G. Thomson coll.; Småland, 1 ♀ (type), C. Boheman: SWITZERLAND, Geneva, Peney, 1 ♀, 15.viii.1884, Tournier; Champel, 1 ♀, coll. Buess: SPAIN, Orviedo, Gijon, 1 ♂, viii.1900: RUSSIA, Dniepropetrovsk, 1 ♂, 7.ix.1943, R. Hinz.

Material of this species stood in the Brussels museum collection under the Holmgren and the Kriechbaumer names, and included the Kriechbaumer type: the two series were associated, and the synonymy was confirmed by examination of the Holmgren type. The clue to synonymy of Thomson's name was given by specimens, determined independently and from literature, by Ch. Ferrière and A. W. Stelfox; and this was confirmed by examination of the two syntypes.

Additional material examined: FINLAND, Hangö, Keuru, 2 ♀♀ (Hellén, 1937: 125; 1941: 48): HOLLAND, Ermelo, 1 ♀, 9.ix.1936, J. Lindemans (this specimen has a pair of pale marks flanking the costa that partly closes the mesolcus); Made, 1 ♀, 2.ix.1942, Oploo, 1 ♀, 16.ix.1947, H. G. M. Teunissen. Dr. Teunissen came independently

to the conclusion that *breviventris* Thoms. and *fulvipes* Kriechb. were conspecific with *rufonotatus* Hlgr.; but I must contest his placing of *rufonotatus* and *breviventris* as varieties of *Ct. lineola* Steph. (1948: 13). The unique male type of *lineola* is in the British Museum (Natural History) and is in very poor condition; but it is undoubtedly a different species.

Ct. rufonotatus Hlgr. and *dahlbomi* Hlgr.

Roman (1914: 16), from a study of the two uniques, placed *rufonotatus* Hlgr. in synonymy with *dahlbomi* Hlgr.: I do not understand the reference to Schmiedeknecht, who merely compiled a description from the two diagnoses given by Holmgren, whereas Roman had the type before him. Having now been able to study *rufonotatus* from adequate material, I must dissent from the synonymy given in 1914. *Ct. dahlbomi* differs principally in the following respects.

Head not thus strongly transverse, more strongly punctate: mandibles not as described for *rufonotatus* but strongly narrowed to middle and then expanded: notaules rather weakly impressed: mesopleura more coarsely and less closely punctate below: propodeum not short, not strongly raised from base nor falling so steeply behind: area superomedia much longer than broad, emitting costulae before middle and not strongly contracted to base: female hypopygium pointed at apex.

The lower face is bright flavous, apart from a rather narrow, median dark band. The scutellum is distinctly pale-marked at mid apex. The gaster is dull castaneous above: tergites 2 to 8 have bright flavous apical margins, which on 2 to 5 are preceded by large, triangular rufous marks: the petiolar segment has a trace of such pale marking at mid apex. The species would, therefore, reckon as a red-bodied species according to the definition given at the head of the key to species (p. 443 below). Stigma and radial cell are broad, as in *rufonotatus*.

The male type of *gracilis* Hlgr. corresponds well with the above, and I think that *dahlbomi* Hlgr. may well prove to be synonymous with it: the lower face, cheeks, and lower angle of pronotum are not pale-marked. On the other hand, I reject the synonymy (Roman, 1909: 285) of *gracilis* Hlgr. with *funebri* Hlgr., which I would classify as a black-bodied species: it is a larger and more coarsely sculptured form, with stouter scape and petiolar segment, with nervellus intercepted not far below middle, with scutellum not pale-marked at mid apex, and with tergites of gaster not rufous marked but merely dull castaneous, with rather obscure pale apical margins.

***Cteniscus gnathoxanthus* Gravenhorst**

Head moderately to rather strongly narrowed behind eyes in female and strongly so in male; somewhat strongly emarginate behind: on vertex, temples, and cheeks rather closely, generally finely but on upper genae in larger specimens moderately punctate, on epistoma and upper face moderately and more or less closely, and on inner orbits very finely punctate: eyes in male distinctly convergent. Clypeus rather sparsely beset, mostly with moderate punctures; deeply and sharply delimited basally; strongly convex in basal half, and more or less strongly impressed before apex, which is moderately, or sometimes rather broadly rounded. Malar space about

three-quarters distance between mandibular apices in female, about, usually less than, half such distance in male. Hypostomal costa slightly raised to where met by genal costa, not close behind mandibular base. Mandible (Fig. 4).

Antennae with scape (Fig. 83) rather elongate, moderately excised externo-ventrally; with postannellus rather elongate, about 1.5 times length of following segment; with flagellum 25- to 29-segmented.

Pronotum with dorsal transverse furrow strongly impressed; with epomiae of moderate strength; laterally finely or rather finely punctate, with a greater or lesser amount of rugosity below. Propleura closely and rather finely punctate. Mesoscutum rather weakly convex, almost flattened on disk; with notaulices sharp and rather strongly impressed; rather finely punctate discally, finely to very finely so peripherally. Scutellum generally rather weakly but sometimes more strongly convex, flattened and generally to some extent buckled discally; finely punctate, generally rather sparsely so above and at sides; not margined beyond scutellar fovea. Mesopleura closely and rather finely punctate below, finely and rather sparsely so above: sternaules very superficial: mesosternum rather finely and closely punctate, prepectus moderately and closely so: mesolcus moderately impressed, broadened beyond middle, usually well closed behind. Propodeum shining and obsoletely rugose above, generally quite clearly punctate on area pleuralis; with costae of moderate strength but costulae irregular: area superomedia seldom delimited basally, distinctly longer than broad, emitting costulae a little before middle.

Petiolear segment of female 1.1 to 1.3 times length of its greatest breadth; not so broadly based as that of *curtisii* Hal. but more distinctly explanate, rather roundedly so and generally not strongly margined; with spiracles situated well before middle and normally not prominent; dorsally obscurely to moderately rugose, with keels distinct to well beyond middle, where it is quite strongly raised: petiolear segment of male longer, 1.3 to 1.8 times length of its greatest breadth; with strong, nearly straight-sided margins and more or less prominent spiracles; dorsally distinctly rugose, with keels strong and sharp and extending about three-quarters length of segment. Remainder of gaster smooth and shining: tergite 2 with thyridia usually narrow in female, broader and more conspicuous in male. Female hypopygium generally rather pointed (considerable variation in this): female third valvulae broad, distinctly finely punctate, normally projecting beyond apex of tergite 8 (Fig. 85).

Wings as described for *curtisii* Hal., but the areolet may be longer petiolate, and the nervellus is often intercepted very far below middle: stigma and radial cell not so elongate as in species with thickened hind tibiae, but more so than in the closest relatives, radial cell about 2.7 times length of its greatest breadth.

Hind tibia and metatarsus of normal proportions (fig. 80): claws of all tarsi rather strongly pectinate.

Length 6 to 9 mm.

Female. Head black, with the following bright stramineous, margined with rufous: palpi, mandibles except at apex, clypeus, and mark going through malar space usually up to the hypostomal costa: lower face black, with only slight extensions of malar marks up the orbits, or with greater or lesser development of similar pale colour; in extreme case black only in mid line, rather broadly below antennae to eye margin,

and almost always just above tentorial pit. Antennae black merging to ferrugineous above, paler below; with basal segments paler at apex. Thorax and propodeum black, with humeral angle of pronotum and tegulae stramineous to flavous; with hind margin of scutellum only at sides and with mark below hind wing stramineous; with ventral margin of pronotum distinctly or obscurely pale at sides. Legs mainly red, the fore and mid tibiae and tarsi rather paler; with fore and mid trochanters and all trochanterelli flavous, and fore and sometimes mid coxae somewhat flavous-marked; with hind tibiae black, rufous in part beneath, distinctly stramineous at base and rufous at extreme base; with hind tarsi black, the segments paler at apex and sometimes beneath. Wings with veins and stigma ferrugineous, paler at base: axillary sclerites flavous. Gaster black above, the tergites having narrow pale apical and pale lateral margins, broader on the hinder segments: venter mainly pale, the hypopygium with or with traces of a broad, V-shaped dark mark well inside margin, and the other sterna with large, paired dark marks: thyridia castaneous.

Male differs as follows. Lower face may be entirely pale except for a small median band in upper part; and pale colour may extend up orbits above antennal sockets. Scape sometimes pale beneath. Legs with a great infusion of flavous into the rufous parts, the coxae being generally mainly flavous: Irish males, however, have the hind coxae mainly black and the hind femora dark. Pale apical margins of tergites 2 and 3 may be broader: hypopygium and previous sternite mainly black.

Redescribed from the following material: IRELAND, Co. Kildare, Landenstown, 1 ♀, 20.viii.1941, Skerries Bog, 3 ♀♀, 26.ix.1946; Co. Wicklow, Rathdrum, 1 ♀, 6.viii.1927, Athdown, 1 ♂, 20.viii.1944, A. W. Stelfox; Co. Dublin, Howth Castle, in wood, 1 ♂, 10.viii.1939, F. J. O'Rourke: ENGLAND, unlocalized, 1 ♀, T. Desvignes coll.; Norfolk, Catfield, 1 ♀, 16.vii.1920, J. J. F. X. King: BELGIUM, unlocalized, 1 ♀ C. Wesmael; Vivier d'Oie, 1 ♀, 13.vii.1884, 1 ♀, 23.vii.1880, 1 ♀, 28.ix.1880; St. Croix, 1 ♀, 4.x.1876; Schaffen, 2 ♀♀, 22.ix.1885; Schelle, 1 ♀, 11.viii.1885; Carlsbourg, 1 ♀, 12.vi.1880; Groenendaele, 1 ♀, 15.ix.1891; ? locality, 1 ♀, 14.ix.1885, J. Tosquinet: SWEDEN, Skåne, Fjällfota sjö, on *Salix*, 2 ♀♀, 7.viii.1938, D.M.S. & J.F. Perkins; Hälsingland, Bergvik, bred from under bark, 3 ♂♂, 5 ♀♀, em. 16-19.vi.1947, O. Lundblad: FINLAND, Sortavala, Rauskunvuori, 1 ♀, 21.viii.1935; Ladoga, Valamo, Pienennukkananlahti, 1 ♀, 31.viii.1935, G. J. K. (see Kerrich, 1940a): FRANCE, unlocalized, ? France, 1 ♀, coll. Puton (Mus. Paris): GERMANY, unlocalized, ? Germany, 2 ♀♀, O. Schmiedeknecht; probably Berlin district, 5 ♀♀, Ruthe coll.; Celle, 1 ♀, 29.viii.1942; Göttingen, 1 ♀, 11.ix.1946, R. Hinz; Bavaria, Görkau, 1 ♀, vii.1930, Th. Kupka: CZECHOSLOVAKIA, Bohemia, Chodau, 1 ♀, 5.ix.1885, 1 ♀, 19.vii.1925, R. von Stein; Erzgebirge, Aussig, 1 ♀, 27.viii.1933; Teschen, Rosenberg, 1 ♀, 7.vii.1936; Bohumin, Haatsch, 1 ♀, 23.viii, 1 ♀, 28.viii, 1 ♀, 20.ix.1936, Th. Kupka.

A black-bodied species without thickened hind legs, and with scutellum not pale-marked except at sides of hind margin. Characteristic features are the rather elongate scape and post-annellus, the closely and rather finely punctate lower part of the mesopleura, the broad or rather broad third valvulae, and the distinctly convergent male eyes. The male is very scarce in collections: Professor Lundblad's bred series, part of which he has presented for the British Museum collection, enabled me to associate the sexes with confidence.

Cteniscus gibbulus Holmgren

Characters diagnosed from a pair taken *in coitu* on a leaf of *Alnus* at Höör, Skåne, Sweden, 25.vi.1938, J. F. Perkins: these were thus determined by him, and also fitted my recollection of the type material.

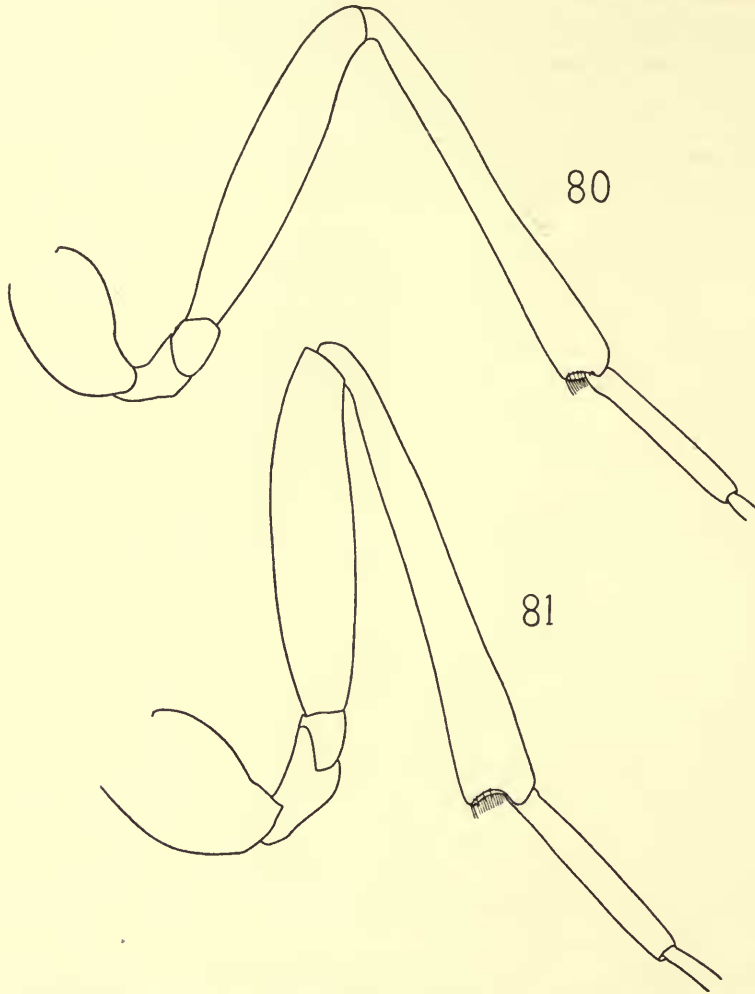
To those characters given in the key to species I add the following: head less strongly narrowed than in *gnathoxanthus* Grav., sex for sex: mesolcus very strongly impressed: propodeum with keels stronger: petiolar segment with dorsal keels strong, in female almost straight-sided: hind legs rather stouter than in *gnathoxanthus* Grav.: wings with stigma and radial cell not nearly as broad as in *rufonotatus* Hlgr. yet broader than in *gnathoxanthus* Grav., radial cell 2.5 times as long as broad: hind coxae and femora mainly black in both sexes.

KEY TO PALAEARCTIC BLACK-BODIED SPECIES OF
CTENISCUS HALIDAY, THOMSON

Black-bodied species, i.e. species with tergites of gaster black or dull castaneous; very often with more or less narrow pale hind margins, which sometimes are triangularly produced forward; in one species often with a rather extensive rufous mark on tergite 2; but *not* with two or more tergites mainly red.

1. Hind tibiae distinctly thickened, as in *hofferi* Greg. (Fig. 81) or more so; in case of doubt scutellum distinctly pale-marked at mid apex 2
Hind tibiae and tarsi of normal proportions; in case of doubt scutellum not pale-marked at mid apex 5
2. Propodeum normally pilose, shining, and not closely punctate: petiolar segment not strongly raised in middle: hind legs thickened about as in Fig. 81, in inner side view the hind metatarsus about $7\frac{1}{2}$ times length of its greatest breadth 3
Propodeum strongly griseo-pilose, dull and closely punctate: petiolar segment strongly raised in middle: hind legs more thickened, in inner side view the hind metatarsus about $5\frac{1}{2}$ times length of its greatest breadth 4
3. Mesosternum irregularly, rather sparsely and coarsely, almost rugose-punctate: sternaulices very superficial: female third valvulae normally not reaching apex of tergite 8: radial cell usually more than 2.6 times length of its greatest breadth: lower face pale, with only a median dark mark above: female hypopygium pale *hofferi* Greg.
Mesosternum regularly, rather finely to moderately and closely punctate: sternaulices moderately impressed: female third valvulae extending a little beyond apex of tergite 8, rather small but stout and densely hairy: radial cell 2.6 times length of its greatest breadth or usually less: lower face with a complete median black band: female hypopygium mainly black, with narrow pale margin *lineiger* Thoms.
4. Head from above distinctly less than eye length behind eye: upper face moderately punctate: mesopleura rather coarsely and closely punctate below: area superomedia distinctly delimited basally: third valvulae projecting distinctly

beyond apex of tergite 8: scutellum with conspicuous quadrangular yellow mark at mid apex *curtisii* Hal.
 Head from above about equal to eye length behind eye: upper face rather finely and sparsely punctate: mesopleura rather finely and sparsely punctate below:

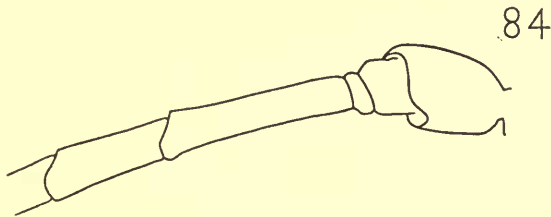
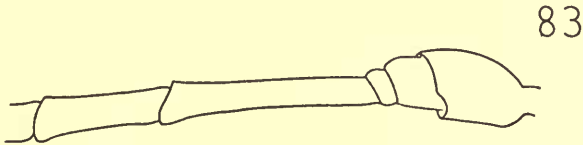


FIGS. 80-81. Left hind leg, in sinistral view, of Fig. 80. *Cteniscus gnathoxanthus* Grav.
 Fig. 81. *Cteniscus hofferi* Greg.

area superomedia not delimited basally: third valvulae broader, projecting scarcely beyond apex of tergite 8: scutellum with no more than a dull red mark at mid apex *romani* sp. n.

- | | |
|--|---|
| 5. Petiolar segment with distinct basal lobes | 6 |
| Petiolar segment without distinct basal lobes | 7 |
| 6. Head about as long behind eyes as eye length, seen from above: hypostomal | |

- costa strongly raised: area superomedia about as broad as long: female gaster quite stoutly spindle-shaped: scutellum conspicuously pale-marked at mid apex: female hypopygium pale *elegans* Steph.
- Head much longer behind eyes than eye length, seen from above: hypostomal costa distinctly but not strongly raised: area superomedia distinctly longer than broad: gaster much more elongate: scutellum not pale-marked at mid apex: female hypopygium blackish *similis* Hlgr.
7. Gaster elongate and slender, with tergites 4 and 5 as long as their breadth at base *pectoralis* Hellén
- Gaster of more normal proportions, with tergites 4 and 5 strongly transverse 8

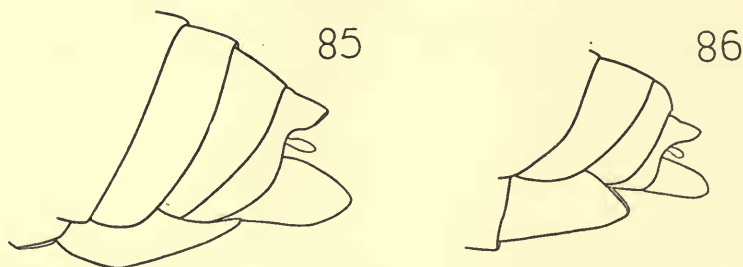


FIGS. 82-84. Left antennal scape and following segments of Fig. 82. *Cteniscus uncinatus* Hlgr.
Fig. 83. *Cteniscus gnathoxanthus* Grav. Fig. 84. *Cteniscus romani* sp. n.

8. Head much longer behind eyes than eye length, seen from above; at least in well-developed specimens distinctly broadened: petiolar segment frequently more elongate than in alternate 9
- Head narrowed and not much longer behind eyes than eye length, seen from above: petiolar segment not elongate, not more than about $1\frac{1}{2}$ times length of its greatest breadth in female or $1\frac{2}{3}$ times (normally) in male 10
9. Antennae with scape strongly convex dorsally and with flagellum decidedly slender (Fig. 82): mandibles with lower tooth more prominent than upper, though a little shorter: female hypopygium sharply folded medially in apical half, pale: male malar space short: lower face without a median dark band: thorax mainly pale below in female *uncinatus* Hlgr.

Antennae with scape of normal proportions and with antennae not relatively slender: mandibular teeth in same plane: female hypopygium not sharply folded, dark with pale margin: malar space not short in either sex: lower face with a median dark band: thorax scarcely at all pale below *consobrinus* Hlgr.

10. Head strongly transverse: upper face finely, seldom in part closely punctate: lower mandibular tooth distinctly a little longer and more prominent than upper: female third valvulae narrow (Fig. 86): stigma and radial cell relatively broad, the latter about 2.1 times as long as broad: hind tibiae mainly clear red, darkened only at apex and not stramineous at base: female propleura largely pale *rufonotatus* Hlgr.
(= *breviventris* Thoms., *fulvipes* Kriechb.)



FIGS. 85-86. Apex of gaster, in sinistral view, of Fig. 85. *Cteniscus gnathoxanthus* Grav.
Fig. 86. *Cteniscus rufonotatus* Hlgr.

Head not strongly transverse: upper face moderately and more or less closely punctate: lower mandibular tooth not distinctly longer or more prominent than upper: female third valvulae broad (e.g. Fig. 85): stigma and radial cell not nearly so broad: hind tibiae mainly black, distinctly dull stramineous at base: propleura scarcely pale-marked 11

11. Antennae longer and more finely hairy, with postannellus about 1.5 times length of following segment: mesoscutum longer, rather weakly convex: mesopleura closely and rather finely punctate below: propodeum longer, with area superomedia longer than broad: female hypopygium mainly pale, with or with traces of a broad V-shaped dark mark: eyes in male distinctly convergent below *gnathoxanthus* Grav.

Antennae shorter and more coarsely hairy, with postannellus about 1.3 times length of following segment: mesoscutum shorter, rather strongly convex: mesopleura rather coarsely and not so closely punctate below: propodeum shorter, with area superomedia broader than long: female hypopygium mainly dark, with pale apical margin: eyes almost parallel *gibbulus* Hlgr.

***Cteniscus aurifluus* Haliday**

- 1832 *Tryphon* (subgenus *Cteniscus*) *aurifluus* Haliday in Curtis, *British Entomology*, **9**: 399.
1838 (Oct.) *Tryphon* (subgenus *Cteniscus*) *aurifluus* Haliday, *Ann. Mag. nat. Hist.* (1) **2**: 113.
1839 *Exenterus geniculosus* Schiödte, *Guerin's Mag. Zool.* **9**: 11-12 (synonym by Morley 1913).

- 1858 *Exenterus approximatus* Holmgren, *Svensk Vet.-Akad. Handl.* **1**: 239 (synonym by Roman 1914).
1858 *Exenterus geniculosus* Holmgren, *ibid.* 241.
1912 *Cteniscus geniculosus* Schmiedeknecht, *Opuscula Ichneumonologica*, **5**: 2343-2344.
1913 *Exenterus aurifluus* Morley, *Entomologist*, **46**: 261.
1914 *Cteniscus geniculosus* Roman, *Ark. Zool.* **9** (2): 16.

Head little broader than thorax; very slightly broadened behind eyes; broadly and rather shallowly emarginate behind; much longer behind eyes than eye length, seen from above: shining, with vertical region and temples sparsely and very finely punctate; with cheeks, upper face and sides of lower face about twice as densely and more coarsely so, and with epistoma still more densely and coarsely so. Frons with a deep impression above each antennal socket, and with distinct interantennal keel. Clypeus rather coarsely and, in apical half, sparsely punctate; broadly rounded apically; deeply delimited; strongly convex; slightly impressed before apical margin. Malar space about as long as distance between apices of mandibular teeth in female, distinctly shorter in male. Genal costa not continuous, weakly raised apically; hypostomal costa slightly more strongly raised. Upper mandibular tooth a little larger than lower (Fig. 5).

Antennae with scape rather deeply excised externo-ventrally: flagellum 29- to 35-segmented (often with a segment more in one antenna than the other, 34:34 in holotype), tapering gradually to apex.

Pronotum with dorsal transverse impression broad and shining; with epomiae of moderate strength; laterally rather finely to moderately punctate above, to some extent longitudinally rugose below. Propleura shining, finely punctate, rugose near inner margin. Mesoscutum dorsally rounded to level of tegulae, thereafter nearly flat to before scutellar fovea; finely punctate, discally somewhat sparsely, peripherally about twice as densely so; between notaulices very weakly rugose: notaulices deeply impressed anteriorly, thereafter very superficial. Scutellum strongly convex and rather sparsely punctate; not margined to middle; its sides irregularly finely to coarsely rugose. Mesopleura and mesosternum moderately punctate, mesopleura sparsely so above; prepectus more coarsely so: epicnemial carina slightly elevated: sternaules rather strongly impressed: mesolcus broadened posteriorly, completely or partially closed behind. Propodeum finely punctate and shining, more or less rugose behind; with costae strong: basal area distinctly delimited: area superomedia elongate-hexagonal, emitting costulae rather before middle.

Gaster not clavate; with tergites 1, except near mid apex, and 2 and 3 at base very finely leathery in female, rugose in male; elsewhere smooth and shining. Petiolar segment about 1.3 times length of its greatest breadth in female, about 1.5 times in male: very strongly margined; with distinct basal lobes; with spiracles prominent in male; medially strongly raised; with strong keels running from basal excavation for two-thirds to three-quarters the length of the segment and bounding a shallow furrow, deeper in male. Tergite 2 with thyridia rather deep but narrow and inconspicuous; with diagonal basal impressions ill-defined but extensive, in male rather deep and also indicated on tergite 3. Female hypopygium rather narrowly to broadly rounded apically: female third valvulae of moderate breadth.

Fore wings with basal and disco-cubital veins not nearly parallel: with areolet broad and shortly petiolate: with nervus parallelus emitted very low on brachial cell. Hind wings with nervellus antefurcal and intercepted far below middle.

Legs with tarsi relatively short. Tarsal claws not pectinate, or with no more than a trace of pectination.

Length 7 to 10 mm.

Female. Head black, often inclining to blue-black; with large genal and very large lateral facial marks white, these sometimes continuous through malar space: clypeus in apical half, sometimes mainly, white, merging to dull straw-coloured or darker marginally: mandibles in basal half white, merging through dull reddish to black at extreme apices: palpi pale reddish. Antennae basally black, with flagellum ferrugineous (relatively pale in type, which may be faded). Thorax and propodeum black, sometimes with scutellum medially and metascutellum dull red: tegulae straw-coloured, often with an outer darker mark: legs red, with apices of hind femora and tibiae and of all tarsi black. Wings scarcely infumate; with wing-veins and stigma fuscous, basally pale. Gaster with segments 1 to 3 and sometimes base, or the whole, of 4 and even sternite 5 red, tergite 1 being black usually only at extreme base; remainder black: tergites 6 and 7 broadly, and sometimes 3 to 5 narrowly white-margined at apex: ovipositor red.

Male. Differs in absence or great reduction of pale genal marks: clypeus duller: segment 1 of gaster black in about basal half, or sometimes almost to apex: apical segments with narrower pale margins.

This species is illustrated on Pl. 7.

Redescribed from the following material: IRELAND, Co. Sligo, Carrowgarry, 1 ♀, 7.x.1940; Co. Kildare, Kilkea, 1 ♂, 10.ix.1940; Landenstown (marsh), 2 ♀♀, 4 ♂♂, 29.ix.1946, A. W. Stelfox; Haliday collection, 4 ♀♀, 4 ♂♂, including holotype and allotype (see below), and including 2 ♀♀, 2 ♂♂ with green-marked pinheads indicating definite Irish origin: ENGLAND: Cambs., 1 ♀, L. Jenyns; Wicken Fen, 1 ♀, 3.vi.1934, 1 ♂, 18.viii.1931, G. J. K.; Chesterton, 1 ♀, 16.vii.1934, F. J. Simmonds; Yorks., V.C. 64, Askham Bog, 1 ♂, 15.vii.1944, W. D. Hincks.

Additional material seen: IRELAND, 27 specimens from ten different counties, A. W. Stelfox: BELGIUM, Tronchiennes, 1 ♀, 10.viii.1867, La Hulpe, 1 ♂, 3.viii.1879, Genval, 1 ♀, 9.vii.1901, J. Tosquinet: SWEDEN, series in Holmgren collection, including unique type of *approximatus* Hlgr. (Stockholm district, 23.viii, C. Boheman): GERMANY, Schwerin, 1 ♂, viii.1889, S. Brauns: RUSSIA, Samara, 1 ♂, vii.1929, Lubischew (coll. A. Seyrig).

Time of appearance: the dates of capture of specimens seen range continuously from 6 July to 12 October. I have wondered whether my own early June date could have been a *lapsus* for July, but Morley (1911) has also recorded the species in early June.

I agree with Roman's placing of *approximatus* Hlgr. in synonymy (1914). The unique male type appears to be a freak form, in which the petiolar segment has the keels and the spiracular tubercles very powerfully developed, and in which the scutellum is very much buckled. The sculpture is mostly developed rather more strongly than usual; and the general form is unusually squat, in conjunction with

which the basal and disco-cubital veins are nearly parallel. But in other respects the specimen agrees so closely with the normal form in both structure and colour pattern that I am convinced it is not specifically distinct.

Selection of types. In the Haliday collection are ten specimens which appear to have been attributed to *aurifluus*: these may be numbered 1 to 10. No. 1, a male, bears the label 'Named by Claude Morley. *Exenterus aurifluus*, Hal. ♂♀. vi.1913': this I take to be a general determination label covering the ten specimens. No. 7, a female, bears three labels 'Type C. M.', 'Haliday', and 'aurifluus', the last-mentioned in Haliday's own writing. No. 8, a male, bears the single label 'Haliday'. No. 9, a female, bears the two labels 'Type C. M.' and 'Named by Claude Morley. *Cteniscus aurifluus*, Hal TYPE vi.1913'. Now Nos. 1 to 8 inclusive belong to the species that has been generally understood as *aurifluus* Hal. (= *geniculosus* Schiødte), and agree with the description given above; but Nos. 9 and 10 are female and male respectively of a different species, which runs down in Schmiedeknecht's key to *pictus* Grav. and fits his description of that form, apart from having an indefinite dark mid line on the yellow lower face.

Why did C. Morley select two types of *aurifluus* and label them as he did? It seemed probable that it was on account of Haliday having quoted both sexes in his diagnosis, and that Morley spared himself the effort of duplicating Haliday's specific label. A. W. Stelfox, who had charge of the collection, wrote to ask whether this were so, pointed out that the second in order had dark hind femora, and asked which of the two should be the first lectotype. In the course of his reply, Mr. Morley wrote that he presumably put a type label on the second *aurifluus* because he had no cotype labels; and that he evidently did not consider the pedal coloration specific. From this it is to be inferred that the first in order, No. 7, is to be taken as Morley's first lectotype.

Distinctions, based on specimens 9 and 10, of *Ct. pictus* Grav. Schmied. from the first species are given below. I think there can be no doubt, on both positive and negative evidence, that Haliday's diagnosis refers to specimens 1-8 and not to 9-10. Accordingly, I designate specimen No. 7, bearing Haliday's own manuscript label, as holotype: thus, the accepted interpretation of Haliday's species is confirmed. Specimen No. 1, a male of definite Irish origin, I designate as allotype.

Cteniscus pictus Gravenhorst, Schmiedeknecht

In the pair misplaced with the series of *aurifluus* in the Haliday collection, I find the following distinctions from that species. Head distinctly broader than thorax, much more transverse. Clypeus narrowly rounded apically, almost truncate in middle of margin. Genae more buccate. Pronotum below more strongly and extensively rugose. Mesopleura distinctly alutaceous: mesolcus narrower and more determinate. Propodeum with costae weaker: area superomedia not basally delimited. Tergite 1 more strongly and regularly narrowed to base. Tergite 3 smooth throughout and tergite 2 almost so. Thyridia conspicuous but not deep. Fore wings with stigma rather broad: with basal and disco-cubital veins nearly parallel. Tarsal claws rather weakly but distinctly pectinate.

Head in both sexes with lower face, except for an indefinite median line, and with clypeus, except around apical and sutural margins, yellow: genae in both sexes with large yellow marks confluent with the yellow of the lower face. Thorax with the following conspicuously flavous: humeral angle of pronotum, hind margin of meso-scutellum at sides, and line below hind wing: also front margin of pronotum above and at sides in male. Legs flavous except as follows: fore and mid coxae at extreme base, and hind coxae and femora mainly, ferrugineous to black: fore and mid coxae mainly, hind coxae apically in male, and all trochanters and trochanterelli, stramineous to flavous. Gaster of female with whole venter red: dorsum mainly red, tergite 1 black except at apex, tergites 6 to 8 mainly and 4 to 5 at sides dark; tergites 5 to 8 apically white-margined: gaster of male more extensively dark.

SUMMARY OF THE SPECIES TREATED UNDER *CTENISCUS*
BY SCHMIEDEKNECHT (1912)

- | | |
|-----------------------------------|--|
| 1. <i>gnathoxanthus</i> Grav. | See above, p. 440. |
| ditto var. 2 | ? = <i>elegans</i> Steph., p. 430. |
| 2. <i>fulvipes</i> Kriechb. | = <i>rufonotatus</i> Hlgr., p. 437. |
| 3. <i>gibbulus</i> Hlgr. | see p. 443. |
| 4. <i>breviventris</i> Thoms. | = <i>rufonotatus</i> Hlgr., p. 437. |
| 5. <i>consobrinus</i> Hlgr. | see p. 436. |
| 6. <i>unicinctus</i> Hlgr. | see p. 434. |
| 7. <i>similis</i> Hlgr. | see p. 445. |
| 8. <i>pullus</i> Hlgr. | |
| 9. <i>morio</i> Hlgr. | = <i>Anisoctenion rubiginosus</i> Grav., p. 328. |
| 10. <i>funebis</i> Hlgr. | see p. 440. |
| 11. <i>gracilis</i> Hlgr. | see p. 440. |
| 12. <i>pachysoma</i> Steph. | |
| 13. <i>pratorum</i> Woldst. | = <i>Exyston pratorum</i> , p. 385. |
| 14. <i>pictus</i> Grav. | see p. 449. |
| 15. <i>marginatus</i> Thoms. | |
| 16. <i>borealis</i> Hlgr. | |
| 17. <i>alpicola</i> Hlgr. | placed in synonymy with <i>borealis</i> Hlgr. by Roman (1913). |
| 18. <i>deletus</i> Thoms. | |
| 19. <i>ustulatus</i> Hlgr. | placed in synonymy with <i>flavomaculatus</i> Grav. by Roman (1931). |
| 20. <i>umbellatarum</i> Woldst. | placed in synonymy with <i>flavomaculatus</i> Grav. by Roman (1931). |
| 21. <i>rufilabris</i> Hlgr. | |
| 22. <i>flavilabris</i> Hlgr. | placed in synonymy with <i>flavomaculatus</i> Grav. by Roman (1931). |
| 23. <i>connatus</i> Hlgr. | placed in synonymy with <i>flavomaculatus</i> Grav. by Roman (1931). |

24. *punctipes* Thoms.
 25. *pumilio* Hlgr. = *Anisoctenion pumilio*, p. 331.
 26. *pumilus* Hlgr. see p. 420.
 27. *lineiger* Thoms. see p. 424.
 28. *mitigosus* Grav.
 29. *approximatus* Hlgr. = *aurifluus* Hal., p. 446.
 30. *frigidus* Hlgr.
 31. *hostilis* Hlgr. placed in synonymy with *flavomaculatus* Grav.
 by Roman (1931).
 32. *signifer* Thoms.
 33. *geniculosus* Schiødte = *aurifluus* Hal., p. 446.
 34. *sedulus* Woldst. see p. 315.
 35. *punctipleuris* Thoms. considered to be var. of *dorsator* Thunb. by A.
 Roman.
 36. *limbatus* Hlgr. = *dorsator* Thunb., see Roman (1912).
 37. *brevigena* Thoms.
 38. *flavomaculatus* Grav. see p. 420.
 39. *minutulus* Pfank. placed in synonymy with *flavomaculatus* Grav.
 by Roman (1931).
 40. *limbatellus* Hlgr. see p. 420.
 41. *genalis* Thoms.
 42. *dahlbomi* Hlgr. see p. 440.
 43. *macrocephalus* Hlgr. = *unicinctus* Hlgr., p. 434.
 44. *autumnalis* Brischke
 45. *rufonotatus* Hlgr. see p. 437.
 46. *quadrinotatus* Thoms. placed in synonymy with *flavomaculatus* Grav.
 by Roman (1931).
 47. *albicoxa* Thoms.
 48. *T-nigrum* Thoms.

CONCLUSION

The author is very conscious that much remains to be done; but time could not be spared in the near future for carrying this through, and others await the results so far attained. The genera *Acrotomus* s.str. and *Diaborus* auctt. require intensive revision, and in the latter genus the types should be examined. The red-bodied species of *Cteniscus* merit equal treatment with the black-bodied ones; and it remains to be seen for how many species there are both red and black-bodied forms. The work of Peck (1937) should be followed up and extended, with particular reference to the male genitalia of *Exenterus*. W. R. M. Mason, who is making a study of the New World species, has discovered further fresh characters widely applicable within the tribe; and when these have been fully worked out and published, they should be studied on Old World material. Larvae have been described only in the genus *Exenterus*, so ample scope remains in this tribe for extending the work of Beirne (1941).

SUPPLEMENT

Genus *ACROTOMUS* Holmgren

Compare pp. 319-321 above. I re-examined the material in the C. G. Thomson collection in 1952, and confirmed that Thomson had *succinctus* Grav. under the name *lucidulus*, apart from one specimen to which reference has been made. Under *auriculatus* he had a good series of *lucidulus* Grav. agg.; and these are not of any obviously distinct form, despite his record of their occurrence mostly in conifer woods.

Genus *ANISOCTENION* Förster

Anisoctenion ridibundus Gravenhorst

Compare pp. 336-338 above. Two male specimens, contained in a sending received in 1952 from Professor Sachtleben, bear the following data: GERMANY, Mecklenburg, 6.vi.1894, F. W. Konow. One of these has the broad, percurrent, median black band of the lower face, which has been considered diagnostic for the male of this species; but the other is without it, as in the female.

Anisoctenion genalis Thomson

1883 *Cteniscus genalis* Thomson, *Opuscula Entomologica*, fasc. 9: 894.

1888 *Cteniscus* (or *Delotomus*) *genalis* Thomson, *Opuscula Entomologica*, fasc. 12: 1255-1256.

Head, seen from above, about $1\frac{1}{4}$ times eye length behind eye; slightly narrowed and rounded behind eyes; shallowly emarginate behind: with punctures of mixed sizes, fine to moderate, rather dense on vertical region but much sparser on temples and genae, especially in female: upper face and epistoma densely and rather coarsely punctate, sides of lower face more sparsely and moderately so. Clypeus sparsely beset with coarse and very fine punctures; basally rather deeply but not sharply delimited; moderately or rather strongly convex; broadly rounded at apex in female, moderately so in male. Malar space about equal to distance between mandibular apices. Hypostomal costa rather weakly raised (about as in *ridibundus* Grav.): genal costa weakly but sharply raised, inflected.

Antennae with scape decidedly short and stout, weakly excised externo-ventrally: flagellum 27- to 32-segmented, distinctly expanded in middle in female, with segments distinctly separated in male.

Pronotum with dorsal transverse impression rather weak, transrugose; with epomiae sharp and of moderate strength; laterally closely, moderately to rather coarsely punctate above, coriaceous-rugose below. Propleura rather finely and closely punctate, shining. Mesoscutum rather weakly to moderately convex; with notaulices weak, but sometimes sharply impressed; for the most part moderately and rather closely punctate, or in larger specimens rugulose-punctate, more finely and densely

punctate anteriorly between notaulices. Scutellum moderately convex in female, strongly so in male, slightly flattened in larger specimens; margined to beyond scutellar fovea; finely to moderately punctate above and behind; obscurely rugose-punctate at sides in female, more strongly so in male. Mesopleura rather coarsely punctate below, moderately so above: sternaulices moderately impressed: mesosternum rather finely to finely punctate, prepectus moderately rugose-punctate: epicnemial carina slightly elevated: mesolcus not strongly yet very distinctly impressed, broadened and transcostate posteriorly, more or less closed behind. Propodeum finely rugose, with area externa finely to rather finely, and area pleuralis for the most part rather finely to moderately punctate, with costae including costulae normally complete, weak in female but of moderate strength in male: area superomedia not delimited basally, about twice as long as broad, broadest where it emits the costulae, before or behind middle.

Gaster slender spindle-shaped or weakly clavate in female, more parallel-sided behind petiolar segment in male. Petiolar segment 1.4 to 1.5 times length of its greatest breadth in female, 1.4 to 1.6 times in male; laterally sharply margined, strongly so in male; with basal lobes more or less strong and spiracles more or less prominent; with dorsal keels distinct to about middle in female, not much farther in male, and with a shallow median depression behind them; finely to moderately punctate, smoother between keels in female, and smooth at mid apex. Tergite 2 with thyridia broad but inconspicuous. Punctuation on tergite 2 rather fine to moderate, on remainder of gaster gradually finer to apex. Female hypopygium quite sharply pointed at apex: third valvulae of moderate size and breadth, with ventral margin almost straight, extending slightly beyond apex of tergite 8.

Fore wings with basal and disco-cubital veins weakly or rather weakly divergent; with areolet usually distinctly petiolate; with nervus parallelus emitted well below middle of brachial cell. Hind wings with nervellus slightly antefurcal, intercepted distinctly below middle.

Legs of normal build. Claws of all tarsi moderately pectinate, the pectination distinctly not reaching apex.

Length 6 to $8\frac{1}{2}$ mm.

Head black, with palpi dull rufous, and with the following parts stramineous to pale flavous, margined with dull fulvous: mandibles except at apex, and clypeus except at base. The dark basal margin of clypeus may be less clearly defined than in *alacer* Grav., and may be darkened only to castaneous. Antennae with flagellum dull rufous in female, more ferrugineous in male; with scape and pedicellus usually concolorous below, but distinctly darker above and at sides; with several basal segments distinctly paler at apex. Thorax and propodeum black, with the following parts in varying degree paler: humeral angles narrowly, marks beside base of scutellar fovea, hind margins of scutellum, and small marks below fore wings: tegulae stramineous. Legs in female with coxae, trochanters, and trochanterelli varying from pale dull rufous, on fore coxae beneath, to more or less infusate, the trochanters and trochanterelli dull flavous at apex: hind femora rufous, very slightly infusate at apex: fore and mid femora pale rufous, sometimes flavescent in part: tibiae and tarsi rufo-testaceous, with very slight infuscation. Male differs as follows: coxae, trochanters,

and trochanterelli much more infusate, the hind coxae blackish: hind femora varying to ferrugineous: hind tibia and mid and hind tarsi with infuscation stronger. Wing veins and stigma dull testaceous to ferrugineous, paler at base. Gaster with the following parts rufous: tergites 2-4 and female hypopygium and third valvulae, usually also tergite 5, and sternite of petiolar segment and its tergite in about apical third; with tergite 1 in about basal two-thirds or wholly, tergites 5 or 6-8, and last two sternites of male strongly infusate; often with rather weak, pale hind margins to these sclerites: sternal region otherwise stramineous to pale rufous.

Redescribed from the following material: ENGLAND, Devon, Dartmoor, 1 ♂, 8.vi.1935, R. C. L. Perkins: NORWAY, Buskerud West, Ål, 1 ♀, 8.vii.1898, E. Strand (Deuts. Ent. Inst.): SWEDEN, Skåne, Alnarp, 1 ♀ (type), Pålshö, 2 ♀♀; Norrland (unlocalized), 1 ♂, C. G. Thomson. The Austrian specimen (see p. 350 above) I determined as *Anisoctenion* sp. near *alacer* Grav. (G. Heinrich 1951, *Bonn. Zool. Beitr.* 2: 246).

Genus *EUDIABORUS* mihi

Following the statement (pp. 415-417 above) on the state of our knowledge of *Eudiaborus* (= *Diaborus* auctt.), I made a preliminary study of this genus in the early summer of 1952, followed by visits to Lund, Stockholm, and Helsingfors. I believe that the results attained should not be withheld from publication until it is possible to complete a full-scale revision; therefore I intend to communicate them to the Editor of *Opuscula Entomologica*, Lund, and hope that he may be able to publish them in 1953.

Eudiaborus boreoalpinus mihi

This species was described (pp. 417-420 above) on account of the distinctive structure, at least in the female, and on account of the boreo-alpine distribution. Further material has been seen in 1952, and I have been asked to publish the additional records.

Further material seen: GERMANY, Silesia, Glatzer Schneeberg, 1 ♂, 2.viii, 1 ♂, 11.viii, 2 ♀♀, 8.viii.1921, K. Hedwig (Deuts. Ent. Inst.): NORWAY, Buskerud East, Krødsherad, 1 ♀, E. Strand (Deuts. Ent. Inst.): SWEDEN, Lapland, Karesuando, 1 ♀, J. W. Zetterstedt (= *lituratorius* var. b, Zetterstedt 1840, p. 389); Torneträsk, 2 ♀♀, 28.vii, 1 ♀ 9.viii, R. Malaise: FINLAND, Pelkosenniemi, 1 ♀, Clayhills; Kuusamo, 1 ♀, 19.vii. 1934 (ref. 360), R. Krogerus; Kuolajärvi, 2 ♀♀ 27.vii.1934 (ref. 145/6), R. Krogerus.

In smaller female specimens the head may be, as in the males, rather more narrowed and rounded behind the eyes than in the type specimen figured above (Fig. 77). The female propleura may have the outer margin quite broadly black in anterior half. In one Silesian male, the median black band of the lower face is so broadened as to leave only a pair of triangular pale marks going about two-thirds the way up orbits of lower face from the tentorial pits.

In this species the mesosternum of the female is very little concave, whereas in *pallitarsis* Thoms. it is strongly concave.

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APPENDIX I

Table of the Occurrence of Species in certain European Countries

+ signifies specimen(s) seen by author.

○ signifies record requiring confirmation.

× signifies record accepted by author.

— signifies record rejected.

	Ireland	England	Belgium	Holland	Sweden	Finland	France	Switzerland	Germany	Czechoslovakia
<i>Acrotomus lucidulus</i> Grav. agg.		+	+	×	+	+	+	+	+	×
<i>Acrotomus succinctus</i> Grav.	+	+	+	×	+	+	+	+	+	×
<i>Anisoct. triangularis</i> Grav.	+	+	+	+	+	+	+	+	+	+
<i>Anisoct. rubiginosus</i> Grav.		+	+	+	+	+	+	+	+	+
<i>Anisoct. pumilio</i> Hlgr.		+			+	+	+		+	+
<i>Anisoct. ridibundus</i> Grav.		+	+	×			+	+	+	+
<i>Anisoct. laticeps</i> Grav.		+	+	×	+		+		+	+
<i>Anisoct. laetus</i> Grav.	+	+	+	+	+	+	+	+	+	×
<i>Anisoct. alacer</i> Grav.		+	+	×	+	—	+		+	×
<i>Exenterus apiarius</i> Grav.		+	+	+	+	×	+		+	+
<i>Exent. abruptorius</i> Thunb.		+	○		+	+	+		+	×
<i>Exent. simplex</i> Thoms.					+					
<i>Exent. oriolus</i> Hart.				+	+	+	×		+	+
<i>Exent. ictericus</i> Grav.			+		+	+	+	+	+	×
<i>Exent. amictorius</i> Panz.		+	+	×	+	+	+	+	+	+
<i>Exent. claripennis</i> Thoms.					+	+				
<i>Exent. adpersus</i> Hart.		+	+		+	+	+	+	+	
<i>Exent. tricolor</i> Roman				×	+	+			+	+
<i>Exent. vellicatus</i> Cushm.									+	+
<i>Exent. confusus</i> sp.n.					+	+			+	+
<i>Exyston cinctulus</i> Grav.	+	+	+	+	+	+	+	+	+	+
<i>Exy. genalis</i> Thoms.			+	+	+	+	+	+	+	+
<i>Exy. phaeorrhæus</i> Hal.	+	+		+			+	+	+	+
<i>Exy. subnitidus</i> Grav.		—						+	×	
<i>Exy. albicinctus</i> Grav.			+	+		+	+	+	+	
<i>Exy. pratorum</i> Woldst.	+	+	+	×	+	+	+	+	+	+
<i>Parexy. calcaratus</i> Thoms.	+	+		+	+	+	+	+	+	×
<i>Smicro. quinquecinctus</i> Grav.	—	+	+	+	+	+	+	+	+	+
<i>Smicro. excisus</i> sp.n.			+	+	+		+	+	+	+
<i>Smicro. trianguligena</i> sp.n.	○	+	+	+			+	+	+	+
<i>Smicro. bohemani</i> Hlgr.		+	+	+	+	+	○	+	+	+
<i>Smicro. perkinsorum</i> sp.n.		+	+	+		+	+	+	+	+
<i>Smicro. heinrichi</i> sp.n.	+	+	+	+	+	+		+	+	
<i>Smicro. jucundus</i> Hlgr.		+	—	—	+	+	○	+	+	
<i>Eudiab. boreoalpinus</i> sp.n.					+	+		+	+	
<i>Cteniscus hofferi</i> Greg.	+	+	+	+	+	+			+	+
<i>Ct. curtisii</i> Hal.	+	+	+	+	+	+	+		+	+
<i>Ct. romani</i> sp.n.	+		+	+	+	+	+		+	
<i>Ct. elegans</i> Steph.		+		×	+	+			+	+
<i>Ct. similis</i> Hlgr.			+	×	+	+	○		+	×
<i>Ct. uncinatus</i> Hlgr.		+	+	×	+		+		+	
<i>Ct. consobrinus</i> Hlgr.	+				+	+				
<i>Ct. rufonotatus</i> Hlgr.	+		+	+	+	+	○	+		
<i>Ct. gibbulus</i> Hlgr.				×	+		○		×	×
<i>Ct. gnathoxanthus</i> Grav.	+	+	+	×	+	+	○		+	+
<i>Ct. aurifluus</i> Hal.	+	+	+		+	×	○		+	

A more detailed analysis of the British fauna will be communicated to the Society for British Entomology. A few additions from other countries were made in paged proof.

APPENDIX II

Flight Table of European Species

This table is compiled from records known or accepted, and is set out in thirds of a month. I have ignored all breeding records, on account of the influence of laboratory conditions; and high Alpine and far northern records, north of 63°, on account of the influence of the shorter summer season.

Dots indicate that the day of the month was not given. It will be appreciated that many of the gaps in the table represent gaps in our knowledge. Some species are omitted, for which there are very few dated records. Some species of *Exenterus* have been more often bred than caught, and dates of capture are correspondingly few.

	<i>Apr.</i>	<i>May</i>	<i>June</i>	<i>July</i>	<i>Aug.</i>	<i>Sept.</i>	<i>Oct.</i>	<i>Nov.</i>
<i>Acr. lucidulus</i> agg.		—	—	—	—	—	—	
<i>Acr. succinctus</i>		—	—	—	—	—	—	
<i>An. triangulatorius</i>	—	—	—	—	—	—	—	
<i>An. rubiginosus</i>		—	—	—	—	—	—	
<i>An. pumilio</i>		—	—	—	—	—	—	
<i>An. ridibundus</i>		—	—	—	—	—	—	
<i>An. laticeps</i>		•	—	—	—	•	—	
<i>An. laetus</i> agg.		—	—	—	—	—	—	
<i>An. alacer</i>		—	—	—	—	—	—	•
<i>Exent. apiarius</i>		—	—	—	—	—	—	
<i>Exent. abruptorius</i>		—	—	—	—	—	—	
<i>Exent. oriolus</i>		—	—	—	—	—	—	
<i>Exent. ictericus</i>		—	—	—	—	—	—	
<i>Exent. amictorius</i>		—	—	—	—	—	—	
<i>Exent. adspersus</i>		—	—	—	—	—	—	
<i>Exent. tricolor</i>		—	—	—	—	—	—	
<i>Exent. confusus</i>		—	—	—	—	—	—	
<i>Exy. cinctulus</i>		—	—	—	—	—	—	
<i>Exy. genalis</i>		—	—	—	—	—	—	
<i>Exy. phaeorrhæus</i>		—	—	—	—	—	—	
<i>Exy. albicinctus</i>		—	—	—	—	—	—	
<i>Exy. pratorum</i>		—	—	—	—	—	—	
<i>Parexy. calcaratus</i>		—	—	•	—	—	—	
<i>Smicro. 5-cinctus</i>		—	—	—	—	—	—	
<i>Smicro. excisus</i>		—	—	—	—	—	—	
<i>Smicro. trianguligena</i>	—	—	—	—	—	—	—	
<i>Smicro. bohemani</i>		—	—	—	—	—	—	
<i>Smicro. perkinsorum</i>		—	—	—	•	—	—	
<i>Smicro. heinrichi</i>	—	—	—	—	—	—	—	
<i>Smicro. jucundus</i>		—	—	—	—	—	—	
<i>Ct. hofferi</i>		—	—	—	—	—	—	
<i>Ct. curtisii</i>		—	•	—	—	—	—	
<i>Ct. romani</i>		—	—	—	—	—	—	
<i>Ct. elegans</i>		—	—	—	—	—	—	
<i>Ct. uncinatus</i>		—	—	—	—	—	—	
<i>Ct. rufonotatus</i>		—	—	—	—	—	—	
<i>Ct. gnathoxanthus</i>		—	—	—	—	—	—	
<i>Ct. aurifluus</i>		—	—	—	—	—	—	



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